TEXTILE WORLD

KINK BOOK

VOLUME VII

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TEXTILE WORLD
KINK BOOK—VOL. VII

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BY

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(Technical Editor, Textile World)

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FOREWORD

In accordance with our usual practice we herewith present to our friends the Annual Kink Book. This has been compiled from the Questions and Answers Department of TEXTILE WORLD and represents some of the best questions submitted during 1923 together with the answers to same.

In addition to these Annual Kink Books, of which this is the Seventh, there are also published from time to time Handbooks devoted to specific branches of the textile manufacturing industry. At this writing the "Cotton Mill Handbook" has been in print for about a year and is now in its second edition. The "Knitting Mill Handbook" is just being published and the "Silk Mill Handbook" is in process of preparation. Subscribers to TEXTILE WORLD may obtain any one of these Handbooks in the same manner that they have been receiving the Kink Books.

We acknowledge our appreciation and indebtedness to the many contributors of TEXTILE WORLD, including manufacturers, superintendents, overseers and experts in mechanical and chemical lines. Readers of TEXTILE WORLD are reminded that their questions are always welcome and the facilities of our organization for getting information on new problems are at their command.

C. H.

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Number of Ends to Put on a Section Beam

Will you please inform me whether it is considered better to put a large number of ends on a section beam in the warping process; or whether a small number of ends on a beam is more desirable? (4811)

The count or size of the yarn is an important factor in deciding the number of ends to run on a beam. With fine yarns a greater number of ends may be placed side by side than with coarse yarns, and what would be considered a large number for a coarse yarn might be normal for a finer yarn. Looking at the question as a request for information as to the advantages and disadvantages of putting the largest number of ends practicable on a beam, as compared with the policy of putting as few ends as practicable on it, we might reply as follows:

If a large number of ends are put on a beam they will lie too close to each other and after the yarn has gone through the size box on the slasher they will not part so readily as when there are fewer ends on the beam. This is especially true if four or five ends from the same beam have to be put in one dent in the front comb. If too small a number of ends are run they will make a ridgy beam. When the end is on the high part of the ridge it will run off slack; when it is on the low part of the ridge it will run tight and is likely to break quite often during the running of the set.

It has been found that it is better to run more section beams with fewer ends per beam on a slasher, as it will give the warp a better chance to separate, which will make it run better in the loom. There should be just enough ends on the beam to make it smooth and level and not ridgy.

Blending Indian and American Cottons

Lately I have noticed a considerable amount of Indian and Chinese cotton being offered in this country. As I understand it, English mills use this cotton in a blend with American cotton. I would appreciate it if you would write me any information you may have as to the proper method of working Indian cotton with American cotton and how the Indian cotton should be best mixed with American cotton. (4762)

We assume that you do not refer to rough Indian and Chinese cottons that are regularly used in this country by blanket and flannel manufacturers, and that average not over 5/8 inch in length.

Owing to the high price of American cotton considerable quantities of smooth Indian and Chinese cottons have been imported this season, length averaging about 7/8 inch, but occasionally running 7/8 to 1 inch. Most of these cottons are rather rough and are somewhat similar to the Texas cottons grown around Corpus Christi.

The only Chinese cotton that compares at all closely with American 7/8 inch to 1 inch is, we believe, called Tien Tsin. This could be mixed with any similar length of American cotton in the same way that American cottons would be blended. The longest of the Indian cottons is a Madras cotton termed Tinnevelly, and a Surat termed Broach. These average 7/8 inch in length and occasionally run 7/8 to 1 inch. Considerable Surat and Madras cotton is grown from Egyptian and American seed and averages 7/8 to 1 inch in length and many of these longer Indian cottons can be blended with similar lengths of American, or processed separately if the desired break and feel in the finished yarn can be thus obtained.

We have run across very few of these long Chinese and Indian cottons in the local market, as they are being used in larger quantities than ever by English and European spinners in place of American.

In a general way it may be stated that the blending of short Indian and Chinese cottons with American cottons does not in any way differ from the blending of American cottons and wastes of similar lengths. The shortest of these cottons are best handled by the wool system of carding, using a mule or Whitin frame for spinning. The latter is the system used by most of the blanket manufacturers in this country to spin rough Indian and Chinese cotton.

If we are correct in assuming from your inquiry that you are looking for the cheapest possible substitute for American cotton about ⅞ to 1 inch in length, we would state that this can be found in Egyptian linters. Large quantities of these have been imported this season and thousands of bales have been shipped South to be mixed with low grade American cotton by companies operating machining plants and we assume that its identity is then lost. Afrita is linters from Egyptian Uppers and the No. 1 grade could have been imported in January (1923) at 12 to 12½c. Scarto is linters from Egyptian Sakelarides and the No. 1 grade could have been imported in January (1923) at around 18c. Sekina is a low grade Egyptian cotton of mixed staple that is sometimes sold as short Sakelarides; this cotton could have been landed in January (1923) within a range of 19 to 22c., according to grade.

French System Preparatory Processes

I should be glad if you would favor me with a reply to the following questions:

(1) Considering that the fibres are totally detached between leather apron and nipper on comber, will an uneven or overdrawn sliver preparatory to comber (French system) cause an unevenly spun yarn so that it is visible with the naked eye?

(2) What advantages or disadvantages are there in using a two-passage Skene & Devalle biparallelizator over three passage other preparatory systems to comber?

(3) What percentage of alkali remains on washed wool when washed by that method with ½ of 1 per cent. of natural grease remaining? (4697)

(1) No man in charge of French combs would attempt to run an uneven sliver because the lap would be uneven at the nip and so prevent proper gripping of the lap at all points across the nip, with disastrous results to the pins on cylinder segments, increase in noil and an irregular fringe which would prevent correct detaching. Overdrafting always produces an uneven end or bunches the short fibres across the sliver. There is absolutely no connection between the defects mentioned and an uneven yarn. It is impractical and unlikely.

(2) This question we read to refer to the use of two or three operations of gilling previous to French combing. Two operations will require less equipment, less power and costs

of production will be decreased. The method will save machines, floor space and labor. It does not produce as good a sliver for the comb and produces more noil at the comb because the fibres are not so nearly parallel and so offer more resistance to pins. Three passages or gillings are sufficient to produce the necessary parallelization of the fibres. Product of gill box drafts should not be less than 400. That is, $7.5 \times 7.5 \times 7.5 = 412.87$, product of drafts. Of course there are exceptions to every rule.

(3) The inquirer is thinking of a "dry" top, that is, a top which does not contain over 0.5 per cent of oil. We know of no scourer who would guarantee to leave 0.5 per cent of natural wool grease in any lot of wool he scours. The custom is to scour clean and add the necessary oil after backwashing.

The French use an emulsion made by adding equal parts (by weight) of olive oil and olive oil soap to the necessary amount of water. This emulsion is sprayed on the wool to give the necessary addition of oil to the wool. The amount of alkali in soap is sufficient to stabilize the emulsion and is a negligible quantity. Chemical tests would reveal its presence and determine the actual amount present in the top.

Knitting Visca Cloth

We are sending you a sample of visca cloth and would like to ask you why the shadings appear on the visca on the right side, and not on the cotton side. We have had considerable of this this year, and we are preparing for a campaign next year, therefore want to be certain of our position. We don't want to make mistakes of this kind again. Is it in the visca, is it in the dye, or is it in the cotton? Can you give us any information that would make the visca run better? (4758)

The shading in this cloth is in the silk straw and is caused, without a doubt, by using different lots of silk indiscriminately in the same piece. Each lot of silk received, either from a dyer or a manufacturer, should be kept separate and used by itself. Though theoretically every lot of like kind, quality and color should be exactly the same, in practice it is not and it is the practical phase of the matter that the knitter has to deal with.

As to making the straw run better, treating with any kind of vegetable oil, such as olive, cocoanut or peanut oil would help, but probably treating with steam while the material is

being knitted is the best procedure. This last method involves some expense in fitting up the machine with the necessary piping and nozzles.

Weave for Lamp Wicking

Will you kindly tell me the weave employed for lamp wicking. I may begin the manufacture of such an article. (4864)

Tubular fabrics such as lamp wicking are usually woven with a plain weave. The warp is made with an odd number of threads, according to Oelsner's "Handbook of Weaves." For example, a warp for lamp wicking may be made with 67 ends, of which 34 are for the upper and 33 for the lower fabric. This arrangement is necessary to prevent two adjacent threads at the edge from being woven alike.

The double plain weave used is shown at Fig. 1, the picks

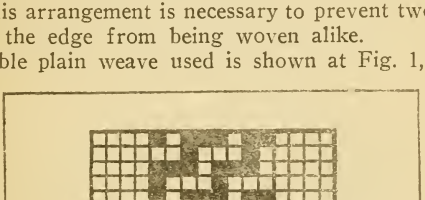


Fig. 1.—Double Plain Weave

being thrown alternately on face and back. Two threads are drawn in the outside dent of the reed; 3 threads in each of the next two dents; and 4 threads in each dent for the rest of the warp. The object of the more open set at the edges is to counteract the tendency of the filling to contract more at the sides than in the center of the cloth.

Percentage of Boil-Off

We manufacture ladies' silk hose made up of 12 strand Japan tram silk. We would like to know the actual or estimated per cent. boil-off on this material. (4727)

The percentage of boil-off on Japan white raw silk at the United States Testing Co. during the year 1922 was from 17 to 21 per cent., averaging 18.95 per cent. The percentage of boil-off on Japan hosiery tram white was from 20 to 27

per cent., averaging 23.90 per cent. The actual amount in gum 12 thread tram can be found by a standard boil-off test, which the United States Testing Co., 340 Hudson St., New York, is prepared to make.

Disposal of Vapor from Kiers

We would like to know the best means of carrying off, or condensing, vapor from the pop-off valves of pressure kiers. There is no circulation without a slight blow-off of steam at the required pressure and this liberated steam (vapor) readily attacks and corrodes paint, metal and woodwork of buildings adjoining the kier room. (4805)

This is one of the perplexing problems of finishing plants. The same question comes up in dye houses and other places where open boiling is carried on or where hot vapor escapes into an open room. Air absorbs vapor up to the point of saturation, but the warmer the air the higher the point of saturation.

One method of taking care of the vapor is to introduce hot air. Almost any company manufacturing blowers will install a system of this kind. Another method used considerably in dye houses is a series of roof ventilators which carry away the vapor as it rises with the heated air of the room.

For the above case vent pipes made of sheet copper, 6 or 8 inches in diameter, and running a sufficient height to produce a natural draft, would probably carry off most of the vapor. Let the pop-off valves blow off into the vent pipes. If the pipes are in the way while hauling the goods, have them jointed so as to swing out of the way.

Calculating Production of Spooler

Please tell me if there is any rule whereby the production of a spooler can be accurately obtained. If you have such a rule I would appreciate very much your giving it to me. (4785)

There is no rule by which the production of a spooler can be accurately obtained unless the many factors involved in spooling are known. The type of spooler, whether upright spindle or one of the several kinds of drum driven spoolers, with either headed or headless spools, the counts of the yarn, the quality of the yarn, the number of spindles allocated to a worker, the number of ends wound to one spool (that is,

single or ply spooling), the average number of ends that a worker has stopped, the condition of the machine, whether clearers are used or not, whether spooler tenders have to get their yarn or whether it is brought to them, whether they have to carry away their spooled product or not; these are some of the factors that must be known in order to calculate the production with any degree of accuracy.

However, the following excellent formula for single-end spooling on an upright spindle spooler with headed spools may be of use to the inquirer: Find the product of—(average winding circumference of spools) x (speed of spindles) x (number of spindles) x (minutes spooler runs) x (per cent. of stoppage), and divide this by the product of 36 (inches per yard) x 840 (yards per hank) x (actual counts). The answer gives the theoretical production.

The average winding circumference of the spools is found by adding the diameters of the full and empty spools, then dividing this sum by two, and multiplying the quotient by 3.1416.

The inquirer can make a test to determine the percentage of stoppage to allow, a factor which varies with the counts, the quality of the yarn, the number of spindles allotted, and the capability of the worker. If a drum spooler is used, the circumference of the drum can be substituted for the average winding circumference of the spool.

Finding Quantity of Yarn in Hosiery

Can you give me the following information regarding a 39 gauge ingrain half hose, made of the following materials: rib top 2-60s mercerized; high splice heel 2-100s mercerized; heels 2-60s and 2-100s mercerized; sole 2-60s mercerized; toe 2-60s and 2-100s mercerized; leg and instep 8 thread silk brought back to weight. How much silk in one dozen pairs, size 10½? How much 2-60s mercerized in one dozen pairs, size 10½? How much 2-100s mercerized in one dozen pairs, size 10½? (4815)

A hosiery manufacturer replies to this question as follows: It has been our practice, through the many years we have manufactured this class of half hose, to use as little silk and as much mercerized as possible, to satisfy our customers and make a first-class line of goods. The questions to be settled are as follows: The length of the rib top, the height of the high splice, the width of the split sole and whether the

sole is wider at the gusset or not. All of these items are variable.

For many years we selected what appeared to be an average stocking from a dozen pair and ravelled it, weighed the component yarns on a grain scale and computed the weight per dozen pairs. The most accurate method, however, is to weigh the yarns, then set up the machines and knit for perhaps half a day. Deduct the amount of yarn remaining from the weight of the original packages. If you divide the weight of each kind of yarn used by the number of stockings knit and multiply by 24, you will have the actual amount of yarn used per dozen pairs.

Coupling Wool Cards; Speed of Rolls

I am sending you a question on carding which I wish you would solve for me. In coupling the first and second breaker cards together, using the doffer of the first breaker and the tumbler of the second breaker card, besides two other rollers to carry the stock over to the second breaker card, what would be the speed of the two rollers? One is 12 inches and the other 20 inches in diameter plus three-quarters of an inch for the clothing. The cylinders are 48 inches in diameter running 90 revolutions per minute. The doffer is 30 inches in diameter running 8 revolutions per minute. The tumbler is 10 inches in diameter running 180 revolutions per minute. (4713)

The surface speed of each of the rolls mentioned must be sufficient properly to clear the stock from its corresponding roll. As the question does not state just what the arrangements of the rolls are to be it is difficult to state the proper speeds. However, the lineup might be as follows: 20-inch roll run at 40 turns, taking the stock from the doffer and delivering it to the 12-inch roll running at a speed of 80 turns and delivering to the tumbler. These are approximate speeds, subject to variation either way according to conditions, stock, etc.

Paper for Twisting

We would be pleased to have you answer the following question: Is it necessary to use a sulphite paper for twisting purposes or may we use a sulphate paper? We have recently installed our own machinery for twisting yarns, and paper which we have received is made of sulphite. We are in a position to buy sulphate paper with a much greater yardage and therefore our reason for asking about this. (4687)

Sulphate paper is used quite as commonly as sulphite for twisting purposes. The German mills use sulphate paper and a very strong yarn is obtained from Swedish kraft which is made by the sulphate process. The paper used depends to some extent on the character of the thread which it is desired to produce.

Cost Calculation for Cotton Yarns and Cloths

We beg to take the privilege of asking a few questions: (1) For the purpose of judging the relation between the price of raw cotton and that of cotton yarn, we would like to know formula of the cost calculation in producing cotton yarn in the mill. To simplify this question, we would appreciate it if you would state how much it would cost to produce a pound of 20s single and 40s single southern skein cotton yarn, an average quality of raw cotton to be used for making same, with detailed items of cost calculation. (2) For the same purpose, the cost calculation of manufacturing cotton piece goods such as 27 inch, 64 x 60, 7.60 yard, and 36 inch, 48 x 48, 3.00 yard cloths. (4781)

In figuring costs in a cotton mill the first step is to apportion the general expense and labor to each department. The labor chargeable to a department is easily obtained, either from a weekly payroll or from the superintendent's standard list of the labor in each department.

The amounts of the general expense chargeable to each department are not so easily obtained, since each item must be distributed separately. The following may serve as a guide in distributing general expense: "Supplies" is distributed on the basis of consumption by departments, a record of the requisitions for supplies from each department being kept; "Fuel" is distributed according to the power requirements of each department; "Taxes" according to the valuation of each department; and so on.

The next step is to ascertain the normal weekly production of a full week's operation. If the average weekly production of finished product is found to be, say 40,000 pounds, with all machinery operating at capacity, and this production is obtained without accumulating surplus at any process, nor having to purchase any roving or yarn, then our cost calculations may safely be based on a production of 40,000 pounds.

Having previously determined the general expense and labor chargeable to the departments, as picking, carding, drawing,

etc., it is now comparatively easy to determine the cost per pound of these operations by dividing the combined general expense and labor charges by the production of 40,000 pounds. This is simplified in a mill making only one finished drawing sliver by adding the picking, carding, and drawing charges together and dividing this result by the production, the result thus obtained being the cost per pound "Through Draw Frames." In mills making only one count of finished roving, the cost "Through Fly Frames" may be obtained in the same way.

The cost on slubbers, intermediates and fly frames involves a little more careful study. An efficient way to obtain these costs is to determine the general expense and labor charge per finished roving spindle, that is, to divide the labor and general expense charge by the number of fine frame spindles. Next the production per fine frame spindle must be determined. This is easily available in mills where there are hank clocks on the fly frames. Where there are no hank clocks, a study must be made to determine the production per spindle. Having obtained the pounds per fine frame spindle week on each count of roving, the cost per pound is obtained by dividing the charge per spindle week for general expense and labor by the pounds produced per spindle week. By adding the result thus obtained to the cost per pound "Through Draw Frames" we arrive at the total card room cost per pound.

The spinning cost per pound is obtained in the same manner as the fly frame cost. The total general expense and labor charge to spinning is divided by the number of spinning spindles to obtain a charge per spindle week. This charge per spindle is divided by the production per spindle week on the various counts of yarn to obtain the spinning cost per pound.

Probably the most satisfactory method of obtaining the cost per pound for reeling would be to apply day labor and general expense as a percentage of piece work. This is done by dividing the total weekly day labor and general expense charge by the total piece work earnings of the reelers, thus obtaining the relation of general expense and day labor to piece work. If this percentage is found to be 80 per cent. and the piece work rate for reeling a particular count of yarn is $.0200 per pound, then the day labor and general expense cost would be 80 per cent. of $.0200 or $.0160, and the total cost per pound for reeling would be $.0200 plus $.0160 or $.0360.

The cotton cost per pound of finished product is found by dividing the cost of cotton in the bale by 100 per cent. minus the waste percentage. For example, if the cotton cost in the bale is 30c. per pound, and the net waste percentage is 15 per cent., then the cotton cost per pound of yarn or cloth is 30c. ÷ .85 (100 per cent, — 15 per cent. = 85 per cent.) or $.3529.

The costs given below are felt to be fairly representative of southern conditions. Local conditions in various plants may cause a variation of 10 per cent. in the cost per pound:

20s YARN

Cost Through Draw Frames	$.0138
Fly Frame Cost	.0170
Spinning Cost	.0342
Reeling Cost	.0061
Total Mfg. Cost per Pound	$.0711
Cotton Cost	.3529
Total Cost	$.4240

40s YARN

Cost Through Draw Frames	$.0138
Fly Frame Cost	.0235
Spinning Cost	.0860
Reeling Cost	.0083
Total Mfg. Cost per Pound	$.1316
Cotton Cost	.3529
Total Cost	$.4845

27 INCH—64 x 60—7.6 YARD

Warp Yarn Cost Through Warping	$.0537
Filling Yarn Cost	.0522
Slashing and Warp Drawing Cost	.0062
Weaving Cost (Incl. Piece-Work)	.0833
Cloth Room Cost	.0047
Total Mfg. Cost per Pound	$.2001

36 INCH—48 x 48—3.00 YARD

Warp Yarn Cost Through Warping	$.0472
Filling Yarn Cost	.0210
Slashing and Warp Drawing Cost	.0024
Weaving Cost (Incl. Piece-Work)	.0313
Cloth Room Cost	.0030
Total Mfg. Cost per Pound	$.1049

Spinning Calculations

Will you kindly tell me how to figure the draft gear for 24s yarn (cotton) with roving weighing 18 grains per 12 yards. What would be the best speed (approximately) for the front roller on a spinning frame in spinning both 24s and 40s yarn from combed peelers, roving 18 grains per 12 yards. (4986)

In figuring for a draft gear it is first necessary to know the draft desired. In this case it is the draft necessary to draw this roving to a 24s yarn. So it is necessary to find the size of the roving. It is common practice to find the size of the roving by dividing the weight of 12 yards of roving (in grains) into 100. For example, in this case divide 100 by 18 and get 5.56, which is the size of the roving, 5.56 hank.

In the spinning operation two of these ends are run together to make one strand of yarn. The equivalent size of two ends is one-half the size of the single ends. This is because the coarser or heavier the strand the smaller the number of the hank. For example, in this case, two ends of 5.56 hank roving are equivalent to 5.56 divided by 2, or 2.78 hank roving.

In order to make this roving into a 24s yarn, it is necessary to draw it out 24 divided by 2.78 times. The draft required in this case is, 24 divided by 2.78, or 8.63 draft.

In figuring for the draft gear it is necessary to know the gearing on the machine being used. For this problem let us assume that the diagram at Fig. 1 shows the rolls and gearing of the spinning frame. The draft, by technical definition, is the ratio between the surface speeds of the delivery rolls and the feed rolls. This is equivalent to saying that the draft is the ratio of the number of yards delivered to the number of yards fed. Of course this may be the ratio in inches delivered and fed as well.

In calculating from a gearing diagram it is best to assume that the back or feed roll turns once and to find how many times the delivery roll turns. Then the number of turns of the delivery roll multiplied by the circumference of the roll gives the number of inches delivered by the front roll while the back feed roll turns once. Now, during the same time the length fed is one circumference of the back or feed roll because it turns just once. The draft then is the length delivered divided by the length fed.

Using the diagram given and assuming a 32 tooth change

gear, find the draft. Find the turns of the front roll, for one turn of the back roll. $(84 \times 120) \div (32 \times 30) = 10.5$ turn of the front roll for one turn of the back.

For each turn of the front roll, 1×3.1416 inches are delivered, so the delivery is $10.5 \times 1 \times 3.1416 = 32.9868$ inches. During this time the back roll feeds one circumference or $\frac{7}{8} \times 3.1416 = 2.7489$ inches. The draft then is 32.9868 (inches delivered) divided by 2.7489 (inches fed) or 12. This can all

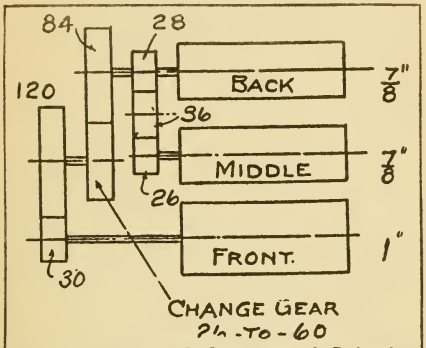


Fig. 1. Rolls and Gearing of Spinning Frame

be condensed into one equation as follows: $(84 \times 120 \times 1 \times 3.1416) \div (32 \times 30 \times \frac{7}{8} \times 3.1416) = 12$ draft.

In practice it is customary to find a "draft constant" for the gearing. This is obtained by finding the draft when 1 is substituted for the number of teeth on the draft change gear. The following gives the draft constant for the above gearing: $(84 \times 120 \times 1 \times 3.1416) \div (1 \times 30 \times \frac{7}{8} \times 3.1416) = 384$ draft constant.

From the location of the draft gear it is apparent that when a number of teeth are put in place of 1, the whole expression is divided by this number and the result shows the draft with a change gear of that number of teeth. $384 \div 32 = 12$ draft with a 32 gear. On the other hand if this draft constant is divided by the draft desired, the result is the number of teeth needed in the change gear. So for a draft of 8.63 divide that number into 384. $384 \div 8.63 = 44.49$ teeth in the change gear.

In this case the gear used might be either 44 or 45, depending upon whether a slightly greater or less draft is preferred.

Recommended front roll speeds for 24s and 40s are as follows, using a 1 inch front roll:

24s warp	125 R.P.M.
24s filling	106 R.P.M.
40s warp	144 R.P.M.
40s filling	122 R.P.M.

Electricity in Wool Carding; Use of Alum

I am experiencing some trouble with static electricity on wool cards and would like to know if the use of alum on wool is injurious to the stock. (4675)

The use of alum on wool would not affect the wool fibre injuriously but it might cause trouble in manufacturing processes. Alum is an acid salt and therefore might have a corrosive action on card clothing. It might break up emulsions used for oiling stock. It is soluble and will wash out of stock and goods, but in some cases it might act as a mordant with some classes of colors if not thoroughly scoured out of the goods. The best way to overcome static electricity in textile processes is by humidifying mill rooms or by the use of such a device as the Chapman electric neutralizer.

After the above reply had been printed in TEXTILE WORLD a reader sent the following: Referring to the question and answer "Electricity in Wool Carding" in the Jan. 27 issue, it seems to me that one of the worst possibilities of trouble from the use of alum on wool has not been mentioned. Of course it all depends on the amount that is used and how it is used. It is stated that alum is soluble and will wash out of the goods, which is of course perfectly true if the washing is done with clear water and the alum has not already become fixed on the fibre in the manner of a mordant.

If, however, the alum is present as the soluble salt and washing were attempted with soap, it would usually be expected to form the insoluble aluminum soap as in ordinary waterproofing. This might appear as shaded areas in dyeing or finishing. While this trouble might never appear, the possibility should be noted in connection with the answer already made.

C. F. G.

Knitting Worsted and Silk Yarn Combinations

Will thank you to advise what counts of yarn in worsted and pure silk, and worsted with artificial silk twisted could be run on 200 needle machine with drop stitch attachment. Also in your experience what percentage of waste and seconds would you allow for? We are just running for our first experience twisted yarn composed of 150 denier artificial silk with 1 thread pure silk and are running same as we heretofore used straight silk. However, we believe there must be some oiling process or other means of softening this combination to prevent holes in the half hose, as we are now finding. (4774)

We infer you have size 3½ inch machines. Machines of this gauge will carry quite a range of yarns. We recommend a trial of 1-40s worsted and a 5 thread pure silk, and 1-50s worsted and 80 denier artificial silk. Waste for worsted and silk should be approximately 3 per cent. under right conditions and not over 8 per cent. on the worsted and artificial. We have tried running 1 thread pure silk but it did not pay and we increased to 3 thread before we made it knit successfully. Twisted yarns are difficult to tension properly. Dampening artificial silk will reduce its strength. If you find it must be moistened, we recommend an olive emulsion.

Carpet Manufacturing Costs

We are looking into the manufacture of Brussels, Wilton and Axminster carpets and rugs and would appreciate anything you can send us on the items of cost entering into this business, expressed in percentages. (4871)

There are so many distinct grades of these goods, which might be manufactured under such widely different conditions, particularly in respect to the Wilton and Axminster carpets, that an opinion of the subject presented merely by general cost statistics in the form of percentages might tend to obscure rather than to throw light upon the questions under discussion. In support of this statement we invite consideration of the following example of the cost of two different grades of Axminster carpets. The first might be manufactured with a woolen yarn top 6 2/3 x 7 tufts to the square inch, with ¾ inch pile, the warps being of 8/3 cotton and the filling of 2/7¼ jute. A carpet manufactured in accordance with the foregoing construction would represent a medium grade. Passing on to the second grade, a manufacturer might

produce a strikingly higher quality by merely substantially increasing the height of pile while adhering to the less expensive construction in all other respects.

TABLE 1—DIVISION OF CARPET MANUFACTURING COSTS

Materials	Amount	Per cent. of net market value
Woolen or worsted yarn, dyed cotton yarns, selvage, etc	$498,924	49.9
Labor:		
Wages paid for winding, weaving and related operations	99,818	10.0
Manufacturing Expenses:		
Power, heat and light, repairs, miscellaneous supplies and other incidental manufacturing expenses	42,409	4.2
Designs	19,965	2.0
General Expenses:		
Property taxes, insurance, salaries of management, office expenses and other miscellaneous general expenses	40,000	4.0
Depreciation:		
Amount of reserve for period in respect to buildings and machinery	35,000	3.5
Interest on Investment:		
Interest at 7½% on $1,000,000	75,000	7.5
Distribution Cost:		
Salesmen's salaries, commissions, advertising, etc	50,000	5.0
Profit	138,884	13.9
Net market value of production	$1,000,000	100.0

Such a change from a medium grade fabric to a high grade fabric would probably entail little or no increase in the labor cost of weaving, finishing and designing, while the material cost (which in any case would be the greatest item) would show such a marked increase that the resulting diminution of the other cost elements, if expressed in a computation of percentages only and without due regard to all governing conditions, would have a distorted appearance in spite of its accuracy.

From a study of the foregoing case, it will be readily admitted that if a tabulation reflecting in percentages the cost

items entering into the manufacture of such merchandise is to be of the most value, it must be reviewed with a full knowledge of conditions.

While this subject is far too complex to be dealt with briefly, and at the same time effectively, to illustrate the subject in a slight measure the writer has prepared some hypothetical figures showing the principal items of cost which would apply to the affairs of a well managed carpet manufacturing business. It is supposed that the industry has an invested capital of one million dollars; that it manufactures high grade goods; that the distribution of these goods is effected through a well managed and efficient sales organization; that the policy of the entire organization is one of specialization and aggressiveness; that the selling price of its goods is not subject to undesirable influence through the establishment of inadequate prices by less efficiently managed concerns in the same line of business; and that the enterprise turns over its invested capital not less than once a year. Under these conditions the relativity of the various cost elements might be approximately as expressed by the percentages summarized below:

Items of cost	Per cent. of net market value of product
Materials	49.9
Labor	10.0
Manufacturing expenses	4.2
Designs	2.0
General expenses	4.0
Depreciation	3.5
Interest on investment	7.5
Cost of distribution	5.0
Profit	13.9
Net market value of product	100.0

It will be noted that included in the above items of cost is a provision for interest on investment. Many industrial engineers contend that such an item should not be included in cost, but the writer prefers its inclusion, particularly when a new business is under contemplation.

In further explanation of these figures the writer has pre-

pared the figures at Table 1, showing under these same significant divisions the totals, expressed in money values, of the items shown in the above summary.

Streaks in Silk Stockings

I am sending you two ladies' stockings, the main yarn of which is a 3 thread pure silk plated over a 140 denier artificial. You will notice in the loose part of the leg what appears to be streaks, which are very noticeable when held in a certain way. I will be very much obliged if you will give me your opinion as to what causes these streaks and how they may be prevented. (4722)

We find very pronounced lines which may have been caused by crooked or uneven lengths of needles or sinkers, or both. Sometimes these lines are caused by the sinker heads becoming clogged with lint. A good overhauling of the needle cylinders should eliminate all such streaks.

Cotton Yarn Costs and Production

We would ask you to kindly give us the following information regarding cotton yarn production in this country:

On cotton yarn of 20s carded single wraps; 40s carded two-ply warps; 60s carded two-ply warps.

1. The operating expenses for production of one bale (400 pounds) of above yarns.

2. The kind of staple and grade of cotton used for the above yarns, and if mixed with different kinds, the percentage of the quantity and quality of cotton mixed.

We would appreciate very much to have the rough figures on the above if you cannot afford to give details. (4670)

In reply to the inquiry as to production, cost per pound and staple and grade of cotton used in the manufacture of 20s warp yarn (carded), 2-40s warp yarn (carded) and 2-60s warp yarn (carded), the following are what would seem to be fair averages for a plant operating on a 48-hour week basis.

In the manufacture of 20s carded warp yarn it would seem advisable to employ a 3.00 hank fine frame roving made of middling cotton of about 1 inch staple. With this as a base, the card room cost, including overhead items, such as interest, depreciation, repairs, supplies, fuel, etc., should be approximately 6c per pound. The spinning cost including overhead as used in the card room would add perhaps 6c. per pound, giving us a total cost through spinning of about 12c. per pound. The

reeling cost, also including overhead charges, would amount to about ¾ of a cent per pound, making a total cost of about 12¾c. per pound or about $51 per bale of 400 pounds, excluding any charges for burlap, rope, etc. A production of about 1.45 pounds per spinning spindle week could be expected on this count of yarn.

For 40s carded warp yarn an 8.00 hank jack frame roving made of 1⅛-inch strict middling cotton would probably be necessary. This yarn would cost, including such overhead charges as were used in the case of 20s warp yarn, about 10c. per pound in the card room. To this must be added the spinning room overhead and labor charges of about 10c. per pound, making a total manufacturing cost of 20c. per pound through spinning.

The spooling overhead and labor charges would add about 2c. per pound and the twisting cost, including what would seem to be a fair overhead charge, should be about 7c. per pound, making a total cost of 29c. per pound for 2-40s carded warp yarn on twister spools. The overhead and labor charges for reeling this yarn would amount to about 0.85c. per pound, making a total cost of 29.85c. per pound, or about $119.40 for a 400 pound bale of 2-40s carded warp yarn, excluding baling costs, etc. A weekly production of 0.67 pounds per spinning spindle week might be expected on 40s carded warp yarn. The production per twister spindle has not been given, since this is largely governed by the turns of twist inserted per inch.

To make 60s carded warp yarn we should employ a 12.00 hank jack frame roving made of strict middling cotton of 1-3/16 to 1¼ inch staple. The cardroom overhead and labor charges would amount to about 12c. per pound; the spinning room overhead and labor charges would be approximately 16½c. per pound, making a total cost of about 28½c. per pound through spinning. The cost, including overhead, for spooling would amount to 2½c. per pound and the twisting overhead and labor charges would amount to 9½c. per pound, making a total manufacturing cost of 40½c. per pound for 2-60s carded warp yarn on twister spools. The overhead and labor charges for reeling would add about 1c. per pound to the cost. This gives us a total manufacturing cost of 41½c. per pound of 2-60s carded warp yarn and $166 per bale of 400 pounds, not including baling charges. The production per spinning spindle week of 48 hours should be about 0.35 pounds. The twisting

production has not been given since this depends largely on the turns of twist per inch to be inserted.

All of the above are conservative estimates of what might be expected in an average New England plant operating on a 48-hour week schedule. The writer has assumed that all the above yarns would be manufactured in the same plant, in which case jack frames would be necessary in the card room for the manufacture of 12.00 hank roving. The card room calculations are therefore based on four-process roving in the cases of 40s and 60s warp yarn.

Cotton costs have not been included in any of the above estimates because of the present unsettled condition of the cotton market. To find the cotton cost it is only necessary to divide the price paid for cotton in the bale by 100 per cent. minus the percentage of net waste. The percentage of net waste in a mill of this character should not exceed 14 per cent.

Uneven Cotton Yarn

Enclosed you will find a sample of cloth and yarn. What causes the soft and uneven places in the yarn and what causes the little soft lumps of cotton in the cloth? We are using low middling cotton with 25 per cent. comber waste. (4682)

Judging from the samples submitted, which really are too small to show conclusively what the trouble is due to, we would make the following answer to the above inquiry.

Considering the cloth first, we find that the "soft lumps" are due to unevenness in the yarn. In some instances these places are particularly prominent because of the way in which heavy and light places in the various yarns come adjacent to each other. This unevenness of yarns will also account for certain unevennesses in the nap on the surface of the cloth. The heavy yarn will make a bunch in the cloth and this bunch will have a heavier nap than the portions made by the light yarns.

This throws the fault in the cloth back on the fault in the yarn. The fault in the yarn is without question unevenness and this unevenness seems to be a result of the spinning. The yarn shows irregularities at frequent intervals, thus indicating that the trouble is from spinning rather than from some operation further back in the manufacturing processes. There may

be one or several causes of this unevenness. First, the mixture of comber waste with other stock usually produces a material difficult to handle. Second, the spinning frame may have some fault or be incorrectly adjusted.

Because comber waste has fibres of so many lengths, it is difficult to set rolls for it. Either the short fibres must be allowed to move along as they will or the rolls must be set closer than would normally be expected. For material of this sort, the middle top spinning roll is often left unweighted and all the rolls are set as close as possible. For short stock, run on a standard frame, this method may not work any too well, because at the closest setting the rolls are too far apart for the short staple.

Selvages Curling in Fulling

We are having trouble with pieces curling on the selvages while they are being fulled. Enclosed is a sample showing the trouble we are having. Could you give us any information as to what would stop a condition of this kind. These goods to have a reasonable cover should full at least two hours. Glad to hear from you and would appreciate any information you can give us. (4775)

This trouble should not be difficult to get rid of. The selvage yarns appear to be laid too closely in the reed, and the selvages are not sewed together before entering pieces into the fulling mill. By reeding the yarns a little wider in the reed and sewing the two selvages together before fulling, we believe the trouble will be remedied. It would be better to put a few more threads in the selvages to keep the pins of the drying machine chains from entering the body of the cloth. A clear dividing line between the selvage and the body of the cloth would also improve the appearance and give distinct lines for width measurements.

Knitted Necktie Pattern

Enclosed please find a piece of necktie made on 1¾-inch cylinder, 24 gauge, and probably 72 needle cylinder. Can you please tell us how this design was made, as we did not receive a satisfactory answer from the machinery builders? (4681)

The pattern appears to be what might be called a "fluke." Whoever made it did so without any premeditated idea by putting on different wheels to try for different effects and

the result is a hodge-podge of raised stitch effects, which are very difficult if not impossible to analyze for duplication.

There seems to be, however, among the rest a well defined zig-zag pattern or design which can be made on a 72 cut cylinder with a 64 print wheel cut as follows:

1 down, 1 up, 1 down, 6 up, 1 down, 1 up, 1 down, 6 up, 1 down, 1 up, 1 down, 6 up, 1 down, 1 up, 1 down, 6 up, 1 down, 1 up, 1 down, 4 up, 1 down, 1 up, 1 down, 4 up, 1 down, 1 up, 1 down, 4 up, 1 down, 1 up, 1 down, 4 up.

If we wished to make something similar to this we should put on a wheel as above for the zig-zag on one feed and try out different wheels on the opposite feed until we got the irregular effects desired.

Winding and Knitting Tussah Silk

We are making a line of half hose in which we are using tussah silk in connection with cotton yarn. We buy this one thread tussah silk (8 cocoon) in skeins, and wind it onto bobbins from which we knit it. We have been having some trouble with this yarn on account of the difficulty in winding and knitting it satisfactorily, and we would be glad to have you give us any information you can as to a better method of handling this yarn. This yarn seems to have a great deal of foreign matter in it and evidently requires some special treatment before winding. We also find that it "gums up" the needles very badly, causing considerable breakage of needles. If you can advise us the best way to eliminate this trouble both in winding and knitting we will appreciate it. (4680)

The eight cocoon tussah has a very open thread and a great number of raw silk defects. The knitting can be improved by adding five turns per inch on the single thread, or double the tussah and the cotton together and give about 2½ turns per inch. The winding can be improved by sprinkling, or better spraying, the skeins with about 5 pounds of olive or neatsfoot oil to every hundred pounds of silk, then packing the skeins in a box over night. Next day open the skeins, hang on a pole and steam the silk in a box or room for from two to five minutes. As each lot varies the time must be studied until the best winding results are obtained. As the steaming opens up the tussah fibres still more it may cause poorer results in knitting if used in the gum untwisted, but on the twisted thread single or doubled with the cotton the steaming will have no effect.

Weaving Terry Towels

Will you give me some information regarding a problem n weaving terry towels. Occasionally I have a warp which when about half woven off the beam gives trouble by some of the ends pulling back at different places across the warp so as to pull the terry out. As you know, the pile warp runs slack. Sometimes I have to cut the warp out and tie it in again. One end here and there seems to be under other ends on the beam. The beam is 40 inches between heads and the warps have 475 to 800 ends of 16s and 20s yarn. (4686)

It seems to us from the description given that the trouble is in making the warp, some of the ends being wound under other ends or sticking on the beam. We do not see how there is anything the inquirer can do with the loom unless he changes the weave to bind the terry loops in tighter, and of course this would not do as the cloth would not be the same kind of fabric. This appears to be a matter that should be remedied at the slasher.

After the above had been published a reader sent the following: Referring to your reply on page 45 of the January 13 issue, in reference to weaving terry towels, I think the real trouble is that the weaver, when a thread breaks, unlaps it from the beam instead of tying it up. As a result, some threads are one lap ahead of others in coming off the beam, and have a tendency to be caught under the other threads. I have had some experiences along this line on both terry and union towels. L. B.

Kier Stains on Cotton Yarn

We are enclosing you two small skeins of yarn 2-60s C. P. This yarn has been boiled out for bleaching with 2½ per cent. caustic, 1 per cent. soda ash, and 1¾ per cent. of a special bleaching assistant. We would ask you if you can give us any reason why one skein should come out white and the other skein brown, all the yarn being alike before it entered the kier. These both came out in the same head of yarn. Any information you can give us in regard to this matter will be gratefully received. (4685)

The stained effect shown by the samples of cotton yarn skeins is evidently through either faulty working of the kier or poor loading of the skeins into the kier. One of the skeins is clearly affected by what is known to the bleaching trade as kier stains. These can be removed by giving the yarn a

treatment in 1½ to 2 degrees Tw. sulphuric acid (oil of vitriol).

Yarns are stained in this manner by either faulty circulation, that is, circulation devices on the kier not functioning properly, or otherwise through the goods being packed in the kier in some places tightly and other places loosely, causing the boiling-off liquors to filter through the loosely packed places and leave a residue in the yarn. We would recommend that the inquirer pay particular attention to the loading of his skeins into the kier, trying to pack them as evenly as possible.

Cloth Calculation

Will you please figure out in a simple way the following problem: Suppose you were going to make a cotton flannel with 68 sley, 48 picks (68 x 48), 27½ inches wide, 3½ yards to the pound, 10s warp. What number of filling should be used to make the goods? (4690)

This calculation may be made as follows: 68 ends per inch multiplied by 27½ inches gives 1,870 ends, plus 24 extra for selvages, or 1,894 total ends in warp. With 10s warp yarn and 5 per cent. for contraction,

$\frac{1,894 \times 105}{840 \times 10} = 23.67$ pounds of warp in 100 yards of cloth. Then 100 yards divided by 3½ yards per pound gives 28.57 pounds of warp and filling in 100 yards of cloth.

28.57 pounds less 23.67 pounds of warp, leaves 4.90 pounds as the weight of the filling in 100 yards of cloth.

Now multiply the picks per inch by the width of the warp in the reed (29 inches). This will give the length of the filling. Multiply this by 100 and divide the result by 840 (standard) times 4.90 pounds. The answer will be the counts of the filling.

68 picks per inch multiplied by 29 inches in the reed gives 1,392 yards of filling, which multiplied by 100 gives 139,200 yards of filling in 100 yards of cloth. Then

$\frac{139,200}{840 \times 4.90} = 33.82$, or practically 34s filling to give the desired yards per pound. It really narrows down to the following:

Divide 100 yards by the yards per pound and the answer will give the weight of the warp and filling as it lies in 100 yards of cloth.

Next figure the weight of the warp and subtract the answer from the total weight of the warp and filling. The answer will give the weight of filling in 100 yards of cloth. Then multiply the picks per inch by the width of the warp in the reed, and by 100. The answer will give the length of filling in 100 yards of cloth.

Finally the length of filling divided by the weight of the filling multiplied by 840 will give the counts of the filling.

Proof

Weight of warp is 23.67 pounds in 100 yards of cloth. 1,392 multiplied by 100 equals 139,200 yards of filling, which divided by 840 multiplied by 34s filling equals 4.84 pounds of filling in 100 yards of cloth.

23.67 pounds of warp in 100 yards
4.84 pounds of fill. in 100 yards

28.51 pounds of warp and filling. Then:

100 yards divided by 28.51 pounds equals 3.50 yards per pound.

Just as a matter of opinion, we would not think much of a flannel made from this warp and filling. The filling is too fine for a good nap.

Knitting Tight Ankle and Foot

We have been using 48 gauge, forward hook F & H needles in our size 3¾ inch, 240 needle machines. We make ladies' hosiery from 2-70s mercerized yarn and are having a lot of trouble trying to make the stockings tight enough in the ankle and foot. We have tried the center hook needles, which give a better fabric, but before making a complete change from forward hook to center hook needles we would like your advice on the same. (4683)

After almost 40 years in knitting, the writer has been unable to discover any difference in the size of the stitch made by forward, center or offset hooks of the same size. We prefer center hooks because the steel is distorted less in manufacture and they are therefore stronger. Of course in making any test comparisons sinkering conditions must be relatively the same in the knitting.

Unless your heels and toes are particularly heavy you might be able to use 48–50 gauge needles, which on account of the smaller hooks would enable you to knit a smaller stitch. Another way is to use a little finer yarn for the ankle and foot to secure the proper width. The only objection to this method is that you must secure the two sizes of yarn with the same degree of mercerization in order to maintain uniform color in the finished goods.

Weight of Duck

We are enclosing you small sample of 12/0 duck used by various oil companies as filter cloth. Would you be so kind as to advise us the number of ounces per square yard in this fabric? (4676)

The weight of duck numbered 12/0 is 30 ounces for 22-inch width. This gives a weight of 49 1/11 ounces per square yard. We do not know of cloths, such as your sample, being numbered differently than other heavy ducks. The cloth appears to be the same as regular 12/0 duck fabric.

Chamoisette Streaked in Dyeing

We are enclosing herewith a small swatch of chamoisette cloth, which apparently shows streaked dyeing. We have gone into this matter with our dyer, but do not seem to get results, and are asking you if it is possible for these streaks to be caused through improper scouring or bleaching. If so, what would you suggest? Could the trouble be in the caustic bath? (4671)

The trouble with this fabric is not with the dyeing but with the mercerizing. These goods are heavily mercerized, and afterwards should be completely washed and neutralized, and all the neutralizing acid washed out. Unless this is done carefully, the goods will dye unevenly, as in this case. This is the experience of almost every dyer of this class of goods.

We presume that the cloth is mercerized for you elsewhere than in your own mill, and that you must take it as delivered. Of course, after it has been through the mercerizing process but little can be done with it to bring it up to the necessary standard for your work, since the mercerizing operations should be complete from start to finish, leaving nothing for the dyer to attend to. Should the work of mercerizing be done in your

own plant, have all details attended to without any attempt at curtailment of time or water in washing.

Since this cloth is mercerized in the piece it might be well to give some attention to the uniform strength of the caustic soda used, and to make sure that the body of the cloth is absolutely saturated with the alkaline solution. From the appearance of this sample of cloth, we are inclined to believe that the mercerization was incomplete. You probably know that mercerized cotton takes up more dye than ordinary cotton from the same dye bath, which shows distinctly in piece goods.

Finding Cost of Elastic Webs

Can you give me any information in regard to obtaining cost of manufacturing elastic braids and cords to see if my figuring is right. We weigh our cotton by the grain and also the rubber by taking six inches of sample and weighing as a whole, then picking same apart and weighing separately. Could you advise any different method of obtaining the cost? (4694)

The method of costing elastic webs and braids which is generally employed is to dissect a fixed weight of web, rather than a fixed length, so as to be able to ascertain the right proportion of each of the component parts by a system of percentages. To do this it is necessary to use scales which are divided into tenth parts of a grain, the bar usually registering 20 grains, and additional weights accompany the scale.

First calculate the number of yards per pound. This is found by weighing 9 inches of material and multiplying by 4 for the weight per yard, then dividing the number of grains into 7,000 (the number of grains per pound). Next weigh very carefully 10 grains of web and dissect same, weighing each of the component parts, which added together should make up the 10 grains. By this means the percentage of each part is ascertained. Each part is then multiplied by the cost per pound of the material, and the sum totalled. This sum is then divided by the number of yards per pound previously ascertained, and the cost of the material per yard is then found.

To this, of course, is added the weaving cost and the overhead decided upon. The cost per pound of materials generally carries the factory costs of spooling, dyeing, warping, etc., as these are fixed mostly by the pound. An example follows:

9 inches of web weighs 54.7 grains
54.7 x 4 = 218.8 grains per yard
7,000 ÷ 218.8 = 32 yards per pound.

A sample of web weighing 10 grains is divided as follows:

60/2	30 per cent.
50/2	40 per cent.
40/2	6 per cent.
Rubber	24 per cent.
	100 per cent.

The cost per pound of each part is as follows:

30 lbs. 60/2 at 70c =	$21.00
40 lbs. 50/2 at 48c =	19.20
6 lbs. 40/2 at 40c =	2.40
24 lbs. Rubber at $1.75 =	42.00
	$84.60 per 100 lbs.

Cost per pound $0.846
.846 ÷ 32 (yds. per lb.) = $0.264 per yd.

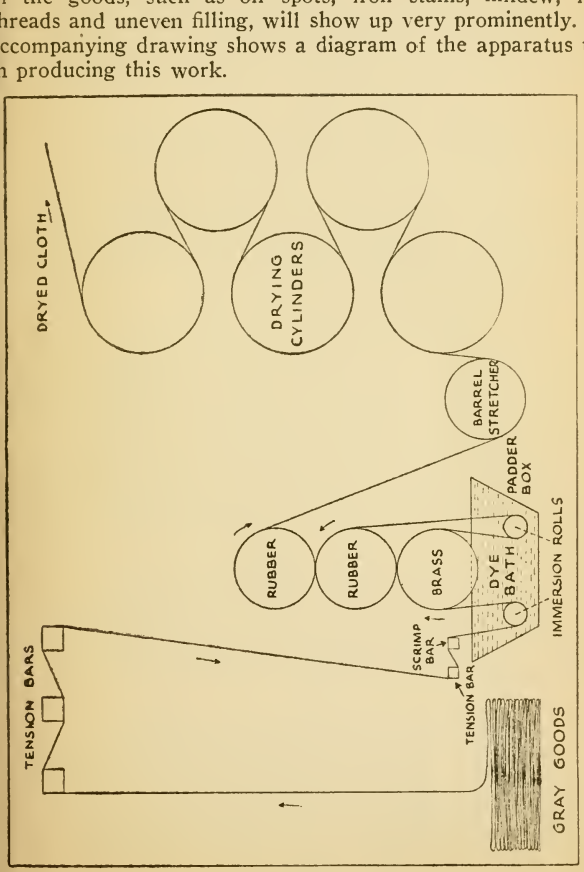
Piece Dyed or Bale Dyed Chambrays

Will you advise us just how the process of piece dyeing or bale dyeing cotton goods is carried out to get a chambray effect. Any information as to how the cloth is handled or what the process consists of for this kind of dyeing will be appreciated. (4944)

Piece dyed and bale dyed chambrays are identical. The gray goods are taken directly from the bale, sewed together and run continuously through a three-bowl padding machine containing the necessary amounts of direct dyestuffs in solution to produce the shade desired.

The best results are obtained by running the goods through a cold dye bath. For deep shades it may be necessary to maintain the bath at a temperature of from 100 to 120 degrees F. In some cases soluble oil and starch or tragacanth solution are added. Goods may be run at the rate of from 60 to 120 yards per minute. If the goods are run from the padder into a truck it is well to add salt to the dye bath to prevent the wet color from running, or marking off in the folds; the salt may be omitted if goods are run from the padder directly onto the drying cylinders. In the rapid passage of the cloth through the solution and squeeze rolls the warp threads absorb the color while the filling threads do not, remaining white, thereby producing the chambray effect.

It will be noted that on some goods the face and back will not be equal depth of shade. Goods of the same construction from different mills will produce different degrees of the chambray effect. In some cases it will be impossible to produce the chambray effect, as the warp and filling threads seem to absorb the color equally producing a solid shade. Of course in this method of dyeing from the bale all imperfections in the goods, such as oil spots, iron stains, mildew, loose threads and uneven filling, will show up very prominently. The accompanying drawing shows a diagram of the apparatus used in producing this work.



Piece Dyeing Cotton Goods to Get Chambray Effect

Yarns for Good Hosiery

I am manufacturing ladies' hosiery on the Banner 240 spring needle machines, and use 2-50s combed peeler mercerized for top, 12 thread Japan silk for leg, single 60s combed peeler mercerized for high splice, and two ends of 2-60s combed peeler mercerized for heel and toe. It will be immensely appreciated if you would tell me of something else for heel and toe to give much more wearing quality. Also what kind and thickness of yarn would be most appropriate to use for seaming the back of stocking that would take the dye properly, as these are made of all natural colored yarns and dyed afterwards. The cost of the yarn in both of these cases is no object whatsoever. (4684)

We think the sizes of yarns you are using are right. Combed Egyptian, Combed Sea Island and linen have more wearing quality, the strength increasing in the order named. The linen will doubtless take a little lighter color; at least, such has been our experience. Any kind of thickness of yarn will take the dye properly if the dye is good and is properly applied and the seam is not too hard.

Uneven Stitch in Knitting

We are mailing to you a sample of black Jersey cloth and we should be glad to have you make an examination of this and advise us the cause of the uneven appearance in the knitting. We were under the impression at first that it was caused by poor dyeing, but we have had this same yarn dyed by various dyers and it all shows the irregularity in knitting, not only in the black, but also in the various colors that we use. We should be very glad to have your opinion regarding this yarn. (4692)

The uneven appearance of this cloth is caused by an uneven stitch, which is probably the result of not having all the stitch cams drawing the same, though it is possible to have this same trouble from other causes, such as an uneven tension on the yarn. The yarn itself appears to be all right.

Properties of Mercerized Fabrics

Can you give me some information regarding the relative strength of a mercerized fabric and an unmercerized fabric of the same construction? How about the life of a garment made from mercerized and one of unmercerized fabric? As regards wear? As regards washing in an ordinary wet wash

laundry? Would the mercerized fabric stand the wet wash laundry handling and chemicals any better than a regular fabric? Will it stand mildew any better? About what is the cost of mercerizing cloth per pound? Of yarn per pound? Can cloth or yarn be mercerized without bleaching? I would thank you if you can give me any information relative to the above or advise me where to look for it. (4702)

These questions could form the basis of extensive research. Authorities on mercerization agree that cotton fabrics, if properly treated during the bleaching and mercerizing process, show by actual test 15 to 20 per cent. gain in tensile strength over unmercerized fabrics. The writer would say that the average life of a mercerized fabric when made up into a garment is also longer than that of an unmercerized fabric. However, this, as well as the question of wear, cannot be stated in definite figures.

We do not think that the mercerized fabric would stand up any better than the unmercerized fabric in the average wet wash laundry handling, nor would it stand the action of chemicals any better. This also applies to the question of mildew. Mildew develops to practically the same degree on either mercerized or unmercerized fabric under the influence of moisture and in the presence of mildew spores.

The cost of mercerizing cloth averages from 1 to 2c. per pound, depending on the method and process in vogue at the point where the mercerizing is done, as well as being governed to a great degree by the method of recovering the caustic wash water. This applies approximately on yarns as well.

Cloth or yarn cannot be fully mercerized without first boiling-off or scouring in water to make the yarn or fabric absorbent. There are a great many concerns mercerizing fabrics in what is known as the "gray state." These fabrics have been simply singed and treated with diamalt or some such product to remove sizing ingredients and they are afterwards washed and then mercerized. Cloth treated in such a manner does not show a really fully mercerized appearance.

Water Band on Warps for Bleaching

We wish to inquire if it is the usual practice of cotton yarn mills always to band their cotton warps. You know, of course, that it is necessary to have a water band on warps before they can be handled very much and especially before they are bleached.

We are contemplating bleaching some warps and would like to know if we would always receive these warps with a water band on them. That is to say, is this rule practically infallible? If we ourselves would have to do this sometimes, we must know this, as it would be necessary for us to install a winding machine or the necessary machinery that would band these warps. (4709)

It is the usual practice in handling long chain warps for bleaching, mercerizing or dyeing to first place a water band around the warps immediately in front of the boiling-out process. As a matter of fact, the writer does not know of any recognized yarn bleachery or dye works that does not use water bands. Most of them, however, remove this water band before the warps are returned to the owner, as the dyer in a great many cases sells the yarn so used after rewinding, in job lots for making tassels or other similar dry goods novelties. We see no reason for the owner of the warps to install winding or unwinding machines for this purpose as the bleacher and dyer must assume all responsibility for such procedure.

Shrinking Hosiery

We are interested in information concerning the proper method of shrinking wool and cotton, and wool and silk combination hosiery. We have used a simple solution of soda ash and soap for boiling, but have not been able to get our shrinkage on this hosiery uniform. Is it generally considered proper to knit wool and wool combinations of hosiery a half or whole size larger than they actually are? (4688)

In the shrinking of wool hosiery or the wool combinations of hosiery the important facts to bear in mind are the following:

First: The strength of soda ash and soap solution. Second: The quality of soap used. Third: The temperature of the solution when goods are worked and the maintaining of the temperature uniformly. Fourth: The percentage of wool in the combinations.

In general practice the soda ash solution should be no stronger than 10 per cent., by weight of goods, but preferably 5 per cent. The soap solution could vary from 7 to 20 per cent. according to grade of soap and the condition of the goods to be finished. The soap most preferable to use is a good neutral soft soap and soaps made from olive oil are to be desired. The temperature of the bath should range from

100 to 115 degrees F. for ordinary shrinking, but if greater shrinking is desired the temperature could be increased to about 135 degrees F. If the wool content of the hosiery is over 60 per cent. the alkali or soda ash must be at the minimum and the temperature should be kept around 100 degrees F. On the other hand, if the wool content is below 60 per cent. the alkali can be increased and the temperature raised.

From the writer's experience in finishing woolen hosiery the goods were knit one whole size larger if they were all-wool or nearly all-wool. However, if the goods contained a good percentage of cotton or silk they were knit only one-half size larger.

A superintendent replies as follows: I have used the following with good results: Treat for fifteen minutes in a cold bath containing a weak solution of hydrochloric acid, ½ degree Tw., extract, and allow to drain without rinsing. Then work for thirty minutes in a cold bath made from chloride of lime at from 3/10 to 7/10 degree Tw. Then drain and return to first bath, and treat for twenty minutes. Then rinse very thoroughly. The goods are then ready to dye.

Bronze Spots on Hosiery After Redyeing

Will you kindly give us your opinion as to what is the chief cause of brown spots on cotton and mercerized hosiery after having been dyed black? We don't seem to have this trouble on first runs, but on goods that have to be redyed we frequently have this result. (4699)

Your trouble is due entirely to an excess of dye in the bath. Nearly all dyes, but particularly blues and blacks, possess the property of showing up bronzy when too much of the color is used. The only remedy is to make use of less dye, or what amounts to the same thing, a more dilute solution. It is to be remembered that mercerized cotton has the property of taking up comparatively more dye than plain cotton, and is therefore more easily overdyed.

Not being informed as to the kind of black dye you are using, whether direct, diazotized, or sulphur, we are not in a position to advise you as to the treatment necessary to remove this bronziness, other than to state that if it is a sulphur black, try passing the goods through a bath containing some sodium sulphide. This will dissolve some of the black from the goods, after which they are to be again redyed, this time with

a small quantity of color. If the goods were dyed with direct dyes, then the excess color is to be removed, first by a good boil with soap, and if this does not remove it, the goods are to be given a light stripping, followed by a good wash, and then redyed.

Finishing Silk and Wool Goods

Enclosed find sample of silk and wool satin-face crepe for your examination. We would appreciate any information you could give us. We want to know who is at fault, the dyer or the manufacturer.

For instance, we will take seven pieces, of which six pieces are of the satin-face style, and one piece of a plain face silk and wool style. We proceed to boil-off the seven pieces in a 30 per cent. olive oil soap solution, then wash the pieces off well in the padding machine. The washing process includes three separate baths of weak solutions, respectively, ammonia, hot water, then muriatic acid. Each bath is heated at 180 degrees F. to cut any soap that might be in the goods. The pieces are sent to dry and all satin-faced pieces are bagged face side on inside, then commence to dye. The dyeing is with Glauber salt and a weak solution of sulphuric acid and the desired colors. The satin-faced pieces appear as the enclosed sample. Besides, there are pieces that show rub marks in a spot-like manner, and in still other places there are these rub marks which show a hole completely through the spot. Now the other plain style of one piece that we dyed in the same lot appears to be perfect throughout the piece in this respect.

We always seem to have some trouble with satin-faced pieces, and very rarely have any trouble in any respect with other styles, including pieces which have a fancy silk and wool crepe with artificial silk designs woven in the pieces. (4700)

The trouble with these goods may be in the dye house, or in the manufacture of the goods. Manifestly, the defect is a distortion of the fabric as well as abrasions. Such defects are to be searched for in the mechanical operations. Abrasions are the direct result of friction, the rubbing of pieces together or against the sides of kettles, etc. Of course, two pieces that rub against each other will cause a roughening of the surface of both, and where this occurs the cause is to be removed.

In the larger piece examined, there appear to be streaks, which when examined seem to result from direct tension applied to the goods, and from the statement that they have been

washed in a padding machine, we are inclined to look for the cause of this trouble there.

Wherever there are rub marks in pieces, be sure that there is undue friction, and the first care of the dyer or finisher is to locate the particular operation where it can occur and correct it.

The chemical treatment to which these goods are subjected appears to be proper. The boiling-off as well as the dyeing is not to be criticized. The goods are clean and well dyed, so far as level shade is concerned. We regard the defects to be wholly mechanical.

Cockled Goods

Enclosed find two pieces of goods with which we are having trouble because of cockling. I am crabbing these goods at 190 to 200 degrees. They are rolled up and let stand over night. You will find one piece which I dipped in hot water. But they still have a slight cockle after sponging. I do not understand why this piece of goods should cockle. You will note tight threads in the warp. (4696)

The trouble is caused by insufficient crabbing. To set a piece of goods thoroughly with two kinds of stock, or a cockly weave, it is necessary to run on both rolls at a boil and see that they are kept at a boil all the time they are running on. The top roll should be put down at the start of the run with a little weight on to keep them from shifting. When all wound on the goods should be run at least a minute with the roll down. This treatment will keep the cockles out of almost any goods and also prevent watermarks.

Action of Frost on Wet Woolens

It is generally understood that the action of frost on wet woolens or worsteds is injurious. Can you give us information regarding the chemical cause of this, as we find in using sulphur bleach on woolens they always appear to come out whitest when the garments are stiff with frost. We would be interested in knowing the reason. (4732)

Any injurious action caused by frost on woolens and worsteds would be of a physical nature rather than chemical. The only explanation we can offer as to enhanced appearance of frozen bleached goods is that it may be due to a physical change and the fibres present a different appearance in the frozen condition.

Finishing Cotton Twine

We are enclosing herewith a small sample of cotton wrapping twine and would appreciate advice as to how this twine is finished. We are anxious to learn the materials used in the size. (4668)

Comparing the sample with other samples of twines, the dressing on which is known, leads us to believe that it has been dressed with a mixture of glue, water, starch, stearine and perhaps a small amount of soap. Such a mixture has been made with the following:

Water	5 gallons
Starch	1 pound
Stearine	5 ounces
Glue	4 to 5 ounces
Soap	2 ounces

These ingredients are boiled together, first softening the glue in some of the water, then making a paste of the starch with another portion of water, and also dissolving the soap in another portion of water. These solutions are then mixed, and while being boiled the stearine is added and stirring continued until the latter has been thoroughly incorporated.

The yarn is impregnated or coated with this dressing by passing it slowly or rapidly through it while contained in a trough in which is partially immersed a roller to depress the yarn. For very high gloss twines, Japan or carnauba wax is to be substituted for the stearine.

Unevenly Dyed Mercerized Goods

We are enclosing herewith a sample of fabric, and upon examination you will notice considerable unevenness and streakiness, which is causing us a great deal of trouble. We are unable to determine whether this is due to the dyeing, mercerizing or some other cause, and we will appreciate it if you will advise the reason for a condition of this kind. (4698)

The general appearance of this piece of cloth indicates that the difficulty complained of is due to the incompleteness of the mercerizing process, or to the imperfect neutralizing of the caustic alkali afterwards. This kind of defect does not show itself until the goods have been dyed, and consequently it should be the aim of the mercerizer to make sure that his solution of caustic is of full strength, and that the cloth to be treated is thoroughly saturated with it.

It is well known that mercerized cotton takes up more dye than plain cotton, consequently evenness of mercerizing is essential so as to reduce the chance of selective dyeing. We suggest that the cloth be thoroughly boiled-out and dryed before immersion in the caustic alkali, and that the strength of the mercerizing liquor be maintained at the proper degree.

Owing to the dense character of this cloth, there is every reason for allowing ample time for both the alkali treatment and the washing to be as complete as possible, particularly after the goods have come from the alkali. A most thorough wash is desirable after the acid treatment.

Finishing Cretonne

We are enclosing samples of cretonne marked "No. 1—Finished" and "No. 2—Unfinished." We seem to experience considerable difficulty in getting the desired softness as per sample marked "No. 1." We use "Amalie" Sulpho Textol Oil, a highly concentrated, double sulphonated castor oil product.

We are referring this matter to you, asking that you be good enough to give us any detailed information and a few of the best formulas you may have for bringing about the desired results. Please bear in mind, however, that under no circumstances must the colors of the goods be stripped. (4710)

It is evident that the inquirer has an entirely wrong idea as to just the proper method of handling printed fabric of the type shown by samples. In the first place, the cause of the stiff or wiry feeling of sample No. 2, as the inquirer is aware, is due to the fact that the printed colors have been thickened with dextrine or some such product which leaves a certain amount of stiffening in the goods.

It is customary in most print works after printing a fabric to wash out this thickening on an open soaping machine, or otherwise discharge the gum by using some of the diamalt products. Not knowing the nature of the colors used, it is difficult for the writer to recommend the exact formula during the washing process but it is certainly a fact that the inquirer will never get the fabrics finished soft unless they are properly washed and cleansed after printing. In addition to the above treatment, sample No. 1 shows every evidence of having been run over a 5-roll calender with two heated metal rolls and three pressed or fibre rolls made from either all cotton or cotton and husk.

Testing Bleached Goods

Could you please give me a formula for testing bleached goods after using bisulphite of soda to make sure that bleaching powder is eliminated? I think it is potassium iodide and starch, but am not sure. What is the reaction if lime is present? Any information will be appreciated? (4706)

The usual mill test used for determining if all chlorine has been eliminated from goods is to test with a solution of starch to which has been added a small amount of potassium iodide. This solution is applied to the goods and if chlorine is still present, deep blue coloration will appear. A sample of the goods may be boiled in a solution of potassium iodide, containing a few drops of starch solution. In this case, the reaction will be the same as above; in other words the cloth will turn blue.

The presence of lime in the goods should not affect the accuracy of this test to any appreciable extent as practically all goods bleached by the chloride of lime process will show on analysis a small trace of lime present.

Test for Wool and Cotton

In making a test to determine the percentage of wool in a mixture of about 86 per cent. cotton and 14 per cent. wool, we boil about half a pound of cotton card sliver in a mixture of caustic soda and water for about half an hour. We use about a gallon of water and about 5 ounces of caustic. Does it make any particular difference to obtain the exact percentage of wool whether the amount of caustic varies slightly and whether the time this mixture is boiled is exactly the same? (4712)

The usual method of determining the amount of cotton or wool in a mixture where there is relatively a large amount of cotton present as compared with wool is to boil the weighed sample for 20 to 30 minutes in a 5 per cent. solution of caustic potash. Any slight differences in the strength of the alkali solution or the time of boiling would not make any great difference in the results obtained. However, it is always advisable in making any chemical test to maintain conditions as near alike in all cases. In other words, the strength of the alkali and the length of time of boiling should be kept the same in every test, where possible. While the usual method is to boil in a 5 per cent. solution of caustic potash, caustic soda will do.

Determining Softening in Yarn

Is there any process to determine or find out if a cotton yarn is softened? Of course this process is done in the skein at the dye or bleach house with a composition of oil, wax and starch. (4705)

The various mixtures used for softening cotton yarns usually consist of some fatty or oily material such as soap, emulsified oils and fats, as well as soluble oils. Oftentimes, there is mixed with these fatty materials starch and certain deliquescent substances such as glycerine, calcium chloride and magnesium chloride, which have the property of attracting moisture and giving the yarns a soft damp feel. The use of calcium chloride and magnesium chloride is not always the best practice, especially if the yarns or the goods into which they are woven are to be singed, as there is danger of the heat used in the singeing process decomposing these salts, liberating free hydrochloric acid which seriously tenders the cotton fibre.

The presence of free oil, wax and fatty matter can be determined in the yarn by extracting the same with ether in a regular Soxhlet extractor and then evaporating off the ether and weighing the ether extract, which consists of the total oil and waxy matter. Starch, of course, can be determined by boiling the yarn for a few minutes in a small amount of water, then cooling the solution and adding a drop or two of iodine solution. If starch is present, there will be an intense blue coloration produced.

Such materials as calcium chloride and magnesium chloride can be determined by ashing the cotton yarn and then making a chemical analysis of the ash. Practically all cotton goods in the gray will show some ether extract, the amount varying from 1 to 1½ per cent., whereas with well bleached goods, the amount of ether extract will vary from approximately 0.03 to 0.04 per cent.

Elasticity in Stocking

We are sending you under separate cover one of our 300 needle combed yarn misses' hose. We have been having complaint on the leg of this stocking not having as much elasticity as some of our competitors. We are using the best grade of combed yarn knit on a ribber with a 300 needle, 4 inch diameter cylinder. May we ask you to examine this stocking and advise us if there is any way that we could set our ribber to get more elasticity on the machine than we

are using. We are trying to perfect a stocking, the standard of which would be accepted as extremely high in the trade. Therefore, may we ask you to criticise this stocking.

(4715)

We believe you should be able to set the stitch on your ribber to knit the tops so they could be stretched to measure 12 inches wide instead of 6½ inches, as in the samples submitted. The small sample herewith from a 5 inch head of about the same gauge will give you an idea of the proper stitch. The finished goods rarely measure quite as large after dyeing. The color is good.

Streaks in Dyed Felt

Under separate cover we are sending a sample of dyed felt to have your opinion as to the cause of its being badly streaked. We have carefully investigated the dyes used and the method of application, and have come to believe that our trouble is something other than that caused by dyes. It has the superficial appearance of being caused by improper fulling, but this also have we very carefully looked into and numerous experiments have produced not very much better results.

It is a fact that from lot to lot and piece to piece there seems to be a decided variation in the quality of the goods produced, occasionally goods of very good character and other pieces as bad as sample sent you coming from the same dye tub. The felt is made from various grades of wool, some shoddy and about 15 per cent. of cotton. Any assistance you can give in this matter will be gratefully appreciated.

(4701)

Aside from the unevenness noted on the surface due to folds of the cloth, the shaded areas appear to be the result of two causes, one or both of which are likely to be present in your dye house. One cause seems to be due to the use of dyes which are not easily levelling, that is, which go on the cloth too quickly. To ascertain whether this is the cause, add the dissolved dye to the bath slowly, and in several portions while the temperature of the bath is gradually increased, until all the dye has been added.

The other cause may be due to the presence of some soap that has not been thoroughly removed by the washing after fulling. If any soap remains in the goods after fulling, this soap will decompose in the subsequent dyeing, with the libera-

tion of fatty acids which in most cases act as a resist for the dye, thereby causing unevenness.

We suggest that the felt be well washed after fulling—washed so well that there can be no soap remaining—and then dyed as above, but following the direction given as to the gradual addition of the dye. This should remedy the difficulty, or at least reduce the unevenness.

Bleaching Red Bordered Crash

Will you please let me know what is the safest thing to use in giving red bordered crash the lye boil? Could I use the usual soda ash and caustic soda? Please tell me the surest way to keep the colors from bleeding; also the strength of the gas bleach. What strength is necessary for speedy bleaching? This is for union crash. (4707)

The inquirer has evidently tried to accomplish results on colored bordered crash goods at high speed in the bleaching process. This should not be done and the point is always emphasized by practical men and all text books. The boil must be somewhat longer than is used on ordinary cotton goods in plain white. The writer would say not less than twelve hours and preferably should be an open boil, that is, not under steam pressure with the kier closed.

Soda ash and soap are really the only ingredients for boiling-off such goods. It is also well to keep the goods away from contact with acid. They should be well washed after boiling and not allowed to lie in bins or piles for too long a period. After washing, the goods should be treated with a weak soda chemic not stronger than one-half degree Tw., or its equivalent in chlorine gas bleach. The time required for the full bleach will be at least two hours in contact with a chlorine liquor.

Tight Threads in Serges

We are experiencing an epidemic of tight threads in our serges. They do not show in the gray and develop only after dyeing. The appearance at the finish perch is that of a thread so tight that it does not take the weave take-up nor dye properly. We use 2-ply worsted yarns from one of the best yarn mils in the country. We have investigated their processes with full liberty without detecting any trouble. In our mill we cannot find anything wrong after exhaustive tests of all kinds, and are at a loss to find what is the trou-

ble. Those tight threads run from 1 to 35 yards and more: the average being around 5 yards. Can you tell us of similar experiences in other mills and what remedy might have been found? (4726)

Provided the yarn is evenly tensioned in spooling and dressing, we incline to the belief that the source of trouble is mixed sorts of yarn, either in respect to qualities or twisting of yarns. If the quality of the tight threads is too fine they will shrink much more in wet finishing. If twisted incorrectly in spinning or doubling, a seemingly too tight offset may be the result. This, of course, implies that the threads may not be too tight, but only seem so by being spun or doubled with the twist in the wrong direction. It is significant that the objectionable threads do not take the proper shade in dyeing, which seems to prove that the cause of the trouble is not in the working of the yarn. We advise you thoroughly to compare the faulty threads with a few threads that are not at fault.

Scouring Wool

We are having some trouble in scouring and drying raw wool as the resultant wool is harsh and appears to be slightly burned by alkali. We have been using a red oil soap of our own manufacture, but will shortly be using a palm oil soap. We use a four-bowl scouring machine. We wish you would please advise us the percentage of soap and soda ash to be used in each of the four successive bowls, together with temperature for same; also advise at what temperature the dryer should be kept. We are enclosing a small sample of wool such as we are now getting from our dryer. (4714)

The sample of wool is well free from grease, but appears to have come in contact with strong alkali and thereby is discolored as well as made harsh. There are various opinions concerning the best scouring agents to use for the scouring of wool, but all agree that the strength of alkali should be no greater than necessary to scour thoroughly clean. A large woolen manufacturing concern that is using a similar sort of wool makes up the scouring baths in each bowl as follows: First bowl, 2 pailfuls of good soap of safe alkaline strength; second bowl, 1 pailful of good soap of safe alkaline strength; third bowl, one-half pailful of same sort of soap and carbonate of soda; fourth bowl, lukewarm water with a sprinkling of ammonia.

The temperature of liquor in the first bowl is kept around 130 degrees F., and in second and third bowls around 120 degrees F., practicing the theory that it is best to start scouring with the liquor somewhat hotter than for the second and third bowls. The wool is dried at 110 to 115 degrees F., and as much fresh air as possible is drawn into the drying machine during the operation. The superintendent of this mill stresses his opinion as to the advantage gained by this.

Taking Stretch Out of Cloth

Do you know of any reliable method of taking all lengthwise stretch out of unbleached cotton cloth? We would prefer to do it without treating the cloth, but if it is necessary to size it we would appreciate information of the method. (4721)

The common method of taking all stretch out of cotton cloth is to wet the goods thoroughly and then dry by festooning the pieces so that they will dry without stretch. This will give a shrinkage of 1 or 2 per cent. generally, depending upon the construction, etc. A machine for drying in this form is manufactured by Proctor & Schwartz, Inc., Philadelphia, Pa.

Cloudy Silk Stockings

I am sending a sample of dip-dyed full-fashioned hosiery, which you will find very "cloudy." Would like to have your opinion as to the cause. Our work is dyed in both copper lined and wooden boxes, direct steam, and no false bottoms. All our colors are more or less affected by this cloudiness, prolonged dyeings being the worst offenders. The silk in the sample was boiled-off previous to knitting, and the whole scoured over night before dyeing. (4755)

The details given above are not sufficient to base a satisfactory opinion on, but we venture to state that if the dye kettle had a false bottom, and if the steam supply pipe was so located that the steam did not strike directly upon the goods being dyed, there would be less cloudy stockings. Of course, the copper lining of the dye kettle might have some influence upon the shade, but we regard this as being the most remote cause of your trouble. It seems that for qualities of stockings shown by the sample it would be economy to install either a rotary dyeing machine or one of the new forms of paddle machines that keep the stockings in con-

stant motion in a relatively large volume of dye liquor. Mention of dye liquor suggests the idea that perhaps you are working with too small a volume of dye liquor; good work requires that the volume should be about three gallons for each one pound of stockings, which under favorable conditions may be reduced to about two and one-half gallons for one pound.

Weight of Roving

Please give weight of roving from cards and the approximate draft on wool to produce a 1¼ run yarn from all B super wool. (4703)

The approximate weight of roving from the card should be 240 grains, which would give about 72 per cent. draft in spinning for 1¼ run yarn. This wool will require a somewhat longer draft in the spinning than is customary on this size yarn.

Streaks in Dyed Cotton Goods

Enclosed are samples of dyed cotton piece goods with which I am having considerable trouble with streaks and cloudy places. Some batches come through all right, although dyed by exactly the same method, etc., as those which come like samples enclosed. The water used for dyeing purposes is very soft water, but in the bleaching end hard water is used mostly. In the bleaching for the kier boil, caustic soda, neutral soap and soda ash are used. Next, goods are rinsed, then limed, then rinsed well and given a sulphuric acid bath to clear. Goods are then well washed in four waters. The undyed cloth sent shows goods ready for dyeing. In dyeing light shades I use Turkey red oil along with soda ash and dye in a monel metal machine. I would appreciate any assistance you could give me in locating the trouble; also on the best method to prepare and dye this class of goods, both for fancy and dark colors. (4738)

If the goods have been treated as above described for the kier boiling, bleaching, etc., and afterwards well washed, there should be no unevenness in the goods when they come out of the dye bath. Without knowing anything about the actual details of the dyeing operation, except that turkey red oil is used and that the dyeing is done in a monel metal machine, we are inclined to believe that the trouble is due to some oversight in that most important process. The smears

on the violet and salmon shades point almost conclusively to unclean kettles, or to the fact that the dye has been added too quickly and not previously dissolved.

After the goods have been bleached and washed, and made ready for dyeing, they should be put in the dye kettle and the dissolved dyestuff gradually added in several portions, keeping the goods in constant motion. The proper temperature for this is about 160 to 170 degrees F., and gradually increase the temperature as the amount of dye is increased. Turkey red oil is desirable for this work and aids in producing level shades. The dyeing should be finished at the boil.

The statement that some batches come through in a satisfactory manner, and others do not, although all are dyed in exactly the same way, leads us to regard the unevenness as being due to unclean kettles, and this is confirmed by the character of the dye marks which look more like "rubs" of the cloth on the inside of the kettles.

Number of Threads That Can Be Woven in One Inch

As a subscriber to your publication I am taking the liberty of writing you for information in regard to the following matter: How many ends of number 18s, two-ply cotton warp could you weave per inch in a fabric, the fabric being plain weave with the same yarn in the filling as in warp. I would be glad to see this figured out on your question and answer page. It is my desire to put in as many ends as possible and still get good running weaving. (4748)

The number of ends of 2-18s cotton warp and filling that can be woven in one inch with the plain weave is something that cannot be determined by calculations because of the many variable factors that enter into such a problem. The number will vary largely with the kind of cotton that is used, the turns of twist in the warp and filling yarns, the kind of loom used, and the manner in which the yarn is spooled to avoid knots. All of these factors have an important bearing on the matter.

The writer once tried to weave a piece of tire duck on a certain duck loom. Try as he would he could not put 24 ends and picks of 23/11 to the inch. But when the warp was transferred to a regular tire duck loom there was no trouble in getting the required number of ends and picks per inch.

Ashenhurst and other writers have theoretically figured the diameter of yarns and the number of ends and picks that would lie side by side in one inch of cloth. But putting the calculated number of threads into the cloth is another proposition. It is an easy matter to draw in a warp of 2-18s and find out from experience just what can be done with the material and equipment available. This is really the only way to find out. The matter cannot be handled by calculations.

Large Holes in Dyed Stockings

We are sending you by parcel post socks which have large holes in them, and we would be glad to have your opinion as to what caused these holes. It seems apparent from the way in which the yarn is broken that these holes were not made on the knitting machine. These goods are carefully inspected for menders by two inspectors before they go to the dye room, and while a few small menders pass both inspections they are not holes of this character.

These goods are not singed, they are dyed in smooth paddle tubs with direct colors and no acid is used in finishing, and we have approximately the same amount of these damaged goods in all colors, though we use different tubs for each different color. As goods damaged in this way amount to about one-half of one per cent. of our production it is quite an important matter, and we will appreciate any advice you can give us as to the cause. (4740)

A dyer replies to this question as follows: Since these socks are passed to the dye house after having been inspected, and when inspected the holes do not show, it would seem that they originate in the dyeing machines. From the size of some of the holes it appears as if a part of the trouble might be due to a partial overloading of the paddle machine, cases of this kind being on record. When dye kettles are overloaded, a certain amount of undue friction arises which shows itself in abraded parts of exposed cloth or stockings, which quickly work into holes. There is also a possibility that at some part of the inside of the dyeing machine there may be very small, rough spots that catch the threads and start the break. The dyeing itself will not cause the socks to go into holes, especially since no acid is used in that operation.

The samples were also submitted to a knitter, who gives the following as his opinion: We believe the holes are

aused by the socks being bruised in handling. We had a rouble of this kind and found that the rough menders threw heir work on the floor and then frequently stepped on them, ot realizing that they could make holes in that way. We ad difficulty in locating the cause of the holes because they id not pull open until the stockings were boarded.

You will notice that the hole in the plain knitting of one f the socks submitted is a double hole, as if the bruise was ufficient to cause both thicknesses of the folded sock to reak. If you will lay one of these stockings on a hard vood floor or even a soft wood floor we think you will be urprised to find how light a blow will make a hole if you ull the fabric afterward.

Needle Lines in Hosiery

Fifteen to eighteen per cent. of our finished product is efective owing to needle lines which appear after dyeing nd I am completely at a loss to locate the cause. By way f additional information, I might add that we use water n the troughs over which the silk runs. If emulsion would e better how should it be prepared so as not to rust the eedles? To illustrate the point of the question, I am ending you a sample of the defective work and certainly ope that you can tell me the cause and how to eliminate it. (4747)

A hosiery manufacturer replies as follows: Your trouble eems to be rusty needles; or you may have a little rust on he sinker noses. The cause is the use of water. We have sed for many years an olive oil emulsion. We mix this emulsion with cold water and stir it. The proportion we ike best is one part of emulsion to nine parts of clean water.

The only experience we ever had with rusty needles was due o poor packing for shipment to us. We used a small white ard held under the work on the machines and close to the eedles in the bar enabling us readily to take out the needles which were marking the work. We sent our rusty needles to manufacturer of latch needles and he rumbled them for us t a very small cost. They came back having a good gloss fter the refinishing.

We might add that if you keep your emulsion clean you will never have any further trouble from rust and your needles will knit better day by day. We have used this on

gum silk and on bright silk, both white, black and many shades; also on bleached white mercerized, all kinds of cotton, worsted and merino with excellent results and we never had any stains which could be traced to the emulsion.

The sample pair submitted indicate that your machines are in first class condition otherwise, and we believe that you used the right amount of moistening.

Moisture Content of Cotton Yarn

Can you tell us what percentage of moisture content is established as standard by the National Association of Cotton Manufacturers, or other recognized authorities, for cotton yarn in the gray and cotton yarn bleached, in 2-20s and 2-30s, ordinary warp twist; also 2-12s? (4724)

No moisture standards for any textile materials have been established by legislative action in the United States, but 8½ per cent. for cotton yarn and 11 per cent. for silk yarn have been recognized officially in the administration of the tariff. In addition, the National Association of Cotton Manufacturers passed a resolution in 1916 recommending the adoption of 8½ per cent. as the standard regain for cotton yarn.

No distinction is made between different sizes of cotton yarn or between yarns in the gray or bleached. The yarns are considered in the same class as regards regain of whatever size, twist, ply or condition and take the same figure of 8½ per cent., according to trade customs.

Stock Not Blending Properly

Under separate cover I am sending you a sample of black mix for 4-run flannel. I am also enclosing a sample of roving which as you will observe is very poor. The lot contains 30 per cent. shoddy, which is very poor. The card is 48 x 48, with 9-inch rings, 5½-inch leader covered with No. 26 diamond point wire. All wire on finisher is No. 34, sheet cylinder, but rings are No. 35 wire, being ¾ inch on top and ⅞ inch on bottom, with 3½-inch waste rings. The doffers make 12 revolutions per minute. The card is set with 30 gauge throughout, and the whole set was ground a month ago. The rings are new and are smooth and sharp. They received a good brushing after grinding and were also brushed with emery flour and stock in hand card, an hour each.

The card turned off good work until this black lot came along. The lot before this one was a black and ran well on card and mule. The lot which is now causing trouble is 550 pounds, being oiled with 10½ gallons of emulsion and 20 gallons of oil. We make roving 88 grains to 50 yards, and it is spun 55 grains. The leader on finisher is set to tumbler with 32 gauge. The draft of wipe rolls and aprons is O. K. I tried setting the fancy off a little and on harder, but it did not help. The fancy is 30-34 wire, 9-inch roll. The bottom spool is the poorer, so I set top doffer off to a 24 gauge and bottom with 26 close. I am convinced that the stock is not fit for 4-run. I would like your opinion in this matter. (4723)

The stock is well carded and the roving is of a good quality. The trouble seems to be that the wool is too coarse for the shoddy, thereby not blending properly for producing a smooth yarn of fine count. It seems advisable to make the roving about 90 grains from the card to spin at 55 grains; also let up a little on the rub to permit satisfactory drawing in spinning.

Stockings Dye Different Shades

We are enclosing herewith a pair of hose taken from the same dye bath and which are knit from the same yarn from one particular mill. You will notice two distinct shades. This yarn is 1-26s double carded on which we have had quite a good deal of trouble lately. The yarn mill claims the trouble is in the dyeing. We cannot possibly see how this can be the case, as their yarn is the only yarn of this kind that we have had in our mills for six or eight months, and if there is anything wrong in our dyeing, the shade would show in streaks or splotches on the same stocking, which trouble we have not had, the whole stocking being one distinct shade. Our contention is there is evidently a great variation in the yarn mill's cotton or they have run in a lot of weather beaten cotton, which we know will give a different shade in the dyeing. We will appreciate your opinion and advice in the matter at your earliest convenience. (4737)

Where stockings come out of the same dye bath showing differences as wide as shown by the two stockings submitted, the trouble must be sought for in the yarn of which they were knitted. It is manifestly impossible for the same yarn, assuming the yarn to be from the same identical lot, to dye up differently in the same dye bath.

Your are correct in believing that if the trouble showed itself as streaks and splotches there might be reason to credit the defects to improper dyeing, but this does not hold in the present case. We think that the trouble is to be found in the yarn. This kind of trouble is frequently found in dye houses when handling lots of raw cotton from different localities. A few tests with different raw cottons will quickly show where the trouble lies.

Bleached Undergarment Is Tender

We are sending you a sample garment about which we would like to have some information. This garment was manufactured about twelve months ago. After being sent out to the customer, who left it on the shelf for five or six months, the fabric got into a very tender condition, as you will notice by the sample. This garment has been put through a light bleach. We would appreciate very much if you could ascertain for us the cause of its going this way. (4759)

The tenderness is due to hydrochloric acid being left in the cloth from the bleaching operation. The cloth is not rinsed long enough entirely to remove all of this acid.

Preserving Sizing for Thread

We have used bluestone in our sizing for thread to preserve it. Can you tell us if formaldehyde is as suitable for this purpose? Will formaldehyde injure cotton in any way? (4766)

Bluestone or copper sulphate is frequently used in sizing mixtures with the idea of protecting the mixtures from fermentation. The best opinion in this connection is that bluestone in the proportion usually used has very little value as a preservative. Other substances like phenol, cresylic acid and salicylic acid are much more effective. Bichloride of mercury and formaldehyde are the strongest preservatives which could be used. The first should be rejected on account of its poisonous character and the danger of having such material around the plant; although in the concentration used it would have no detrimental effect upon the fibre to be sized.

Formaldehyde is usually objected to on account of the disagreeable odor and also because when used in hot solutions considerable loss is sustained, owing to its volatile character. If used at all, it should be added and stirred in after

the boiling operation has been completed, and after the temperature of the sizing solution has been reduced as low as is consistent with good sizing results. It should be used in the ratio of one-quarter of one per cent. of the commercial 40 per cent. solution based upon the total volume of paste. In other words, 100 gallons of sizing mixture would require one-quarter of the commercial 40 per cent. solution. Formaldehyde has no detrimental effect upon the fibre and when used in the proportion and under the conditions stated, does not materially affect the sizing mixture.

DR. W. R. CATHCART,
Technical Director, Mill Division,
Corn Products Refining Co.

Uneven Work from Napper

We have a 24-roll double acting napper at the mill which is giving us trouble. Will you please give me any information on the subject This is a used machine which I erected myself and at the same time put on new clothing throughout. For two months it worked satisfactorily, then it commenced to nap more on one side than on the other. I stripped the clothing off both the napping and counter napping rollers, and put it on again tighter, taking out any possible stretch there may have been, but it was no help. I looked over the alignment of the machine and also tried it for levelness and that part is O. K. I then tried turning my napper rolls around, making the counter napping rolls into the napping rolls and the napping rolls into the counter napping rolls, and thereby turning them all completely around. Now the machine naps harder on the opposite side to what it did before. That places the trouble in the rolls. Can you please tell me the cause of my trouble and what to do to remedy it? (4761)

The inquirer is not the only one who has this trouble with nappers. It may sometimes be laid to the goods, as at times pieces are not woven alike, or the selvages are different. If you have always napped the same style of material on the machine and it worked satisfactorily, it cannot be the fault of the goods and the trouble must lie in the machine.

Your trouble may be as with many others in the cleaning brush attached at the bottom of the machine. This cleaning wire brush requires the most careful adjustment. It must be set to a hair to the napper rollers on all places, otherwise if the brush cleans out more on the side than in the center,

or vice versa, a difference will appear on the nap. Attention must also be given to the rollers to see that the wire is wound on exactly as it should be. In order to get the napper rollers even it is preferable to use a grinding machine instead of grinding by hand. Also, the operator should see that the goods are not always run in the center. At times they should be changed to run more on the sides, otherwise the center of the napper will get dull too rapidly.

Finishing Cashmere Stockings

We would like to know the proper way to finish cashmere stockings similar to this sample. What is done with the goods when they get to the finishing department? How are they washed and fulled? Are they bleached at all? Kindly give us full particulars regarding the finishing of cashmere stockings. (4763)

In finishing cashmere hosiery similar to sample submitted, the following process is carried out: The goods are first given a light scouring in a bath prepared with an olive oil soap (or any other good neutral soap) at a temperature of 110 to 115 degrees F. The time to run goods in the rotary washer is about 30 minutes.

After the scouring bath the goods are rinsed well with warm water and then rinsed finally with cold water. After the goods are extracted they are ready for a full or semi-bleach and from the sample submitted the writer would say that this hose was semi-bleached.

To give the goods a nice soft feel the hosiery is worked for five to fifteen minutes in a bath containing about 2 to 5 per cent. of a high grade soluble oil, the temperature to be about 110 degrees F. The goods are then extracted and are ready to go to the boarding room to be put on forms to be dryed.

Scouring Spinning Frames

What does the scouring of spinning frames refer to and how often should this work be done? (4779)

Scouring of spinning frames refers to what might be called a thorough cleaning, overhauling and readjustment of the frames, but more especially it refers to the drawing rolls. When scouring, the rolls should be removed and the bottom fluted rolls scoured by rubbing with card fillet to remove any

dirt that may be lodged in the flutes, afterwards rubbing with a paste made of oil and whiting spread on card fillet, or dry whiting on waste.

Care should be taken that all rolls are closely inspected for rough places. Any of these should be rubbed smooth with a fine file and finished with pumice stone.

Top rolls should be carefully inspected and bad or uneven rolls replaced with good ones. The bearings should be carefully overhauled and leveled and all gears inspected. When replacing the rolls a little grease should be placed on the necks to insure good lubrication.

While the frame is held up for scouring there is a good opportunity to remove the spindles from the bolsters, pump out the old oil and thoroughly clean the various parts; also the ring rails could be removed and washed in a tank of boiling water and ammonia and afterward rinsed in a tank of clear boiling water. They will come out clean and bright. Some mill men prefer gasoline as a means of cleaning rings. Oakite is gaining in use. Just before the hot, humid summer weather comes is a good time to clean rings. If the dirt is left on during this weather it has a tendency to become sticky and is a cause of bad running work. When replacing ring rails after scouring, care should be taken to level them both lengthwise and crosswise so that the travelers will not be running up hill at any point.

The frequency with which frames should be scoured depends somewhat on the counts of yarn being spun. Generally speaking, frames spinning below 20s should be scoured three times a year, 20s to 50s, twice a year, and above 50s once a year should be sufficient. Frames that get good continuous care should not need scouring as often as frames that are neglected, or are in hard service such as running night and day.

Skin Attached to Wool Fibres

You will find enclosed sample of wool which we are having trouble with. You will notice small pieces of skin attached to the wool which got into the cloth. The carder says he can't get them out. I would like your advice how best to get rid of the pieces of skin. (4764)

There is probably no practical way of removing these small pieces of skin except by sorting them out of the wool or picking them out of the cloth by hand. The latter method

would be hard on the card wire and it would be better to sort out the pieces of skin if the wool must be used. There is no chemical method of removing skin from wool which will leave the wool in good condition. Boiling out the material with about a 5 per cent. solution of sulphuric acid will dissolve the skin and leave the wool, but the fibres will be in a damaged condition for spinning and more or less discolored. The best plan would be not to attempt to use the wool.

Tucks or Pleats Woven in Cloth

I enclose a sample of cloth with a fold, flap, tuck or pleat woven in. I would like to have the weave and draft for this character of fabric. (4931)

Woven tucks, or pleats, as they are often termed, are made to run from selvage to selvage. They are not difficult to weave unless the tucks are very large, but it is rarely that a woven tuck is found that will exceed 3/16 of an inch in width.

Two warp beams are required and these are termed top and bottom beams. The yarn from these beams are drawn in separate sets of harnesses because, when the tuck is weaving, the harnesses carrying the yarn from the bottom beam do not work while the yarn from the top beam, drawn through another set or harnesses, is weaving the tuck.

Whatever the sley of the cloth, one one-half of this sley is used for the weaving of the tuck. When the tuck is woven all of the harnesses become operative and the sley of the body cloth, or that part of the cloth between tucks, will be woven in with the sley twice as heavy as is the sley of the tuck. Hence, it is advisable to use a two-box loom for the weaving of cloths of this type.

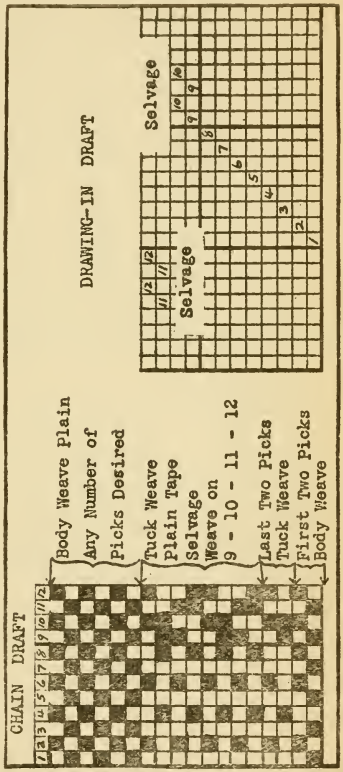
By the use of a two-box loom, filling heavier than that used in the body of the cloth can be inserted and this heavier filling will offset the difference between the sley of the tuck and the sley of the body cloth. This heavier filling will add more body to the tuck, making it firmer and causing it to lie flat on the face of the body cloth. The firmer the tuck, the closer it will lie and this is the effect desired.

A dobby loom is required for the weaving of tucks and it is advisable to use at least 12 harnesses; four of these harnesses will be required for the weaving of a tape selvage, four for the weaving of the tuck, and the remaining four for weaving the body cloth in conjunction with the four har-

nesses for the tuck. The use of this number of harnesses is not arbitrary; it is a matter of judgment and must be governed by the density of the sley and the weave desired for the body of the cloth.

It is not practical to use other than a plain weave in the making of the tuck. Any other weave would not be firm enough. If the body of the cloth has to be other than a plain weave it is good practice to weave plain for a few picks preceding the beginning of the tuck, this will make the tuck lie closer to the body cloth after it is bound in.

During the weaving of the tuck, the harnesses carrying the yarn from the bottom beam will remain down and suitable connections are made from the dobby so that the take-up will remain idle until the weaving of the tuck is completed. The bottom warp beam must not be permitted to move for it is absolutely necessary to have the fell of the cloth, leading from the bottom beam, in the same position as it was when the harness carrying the yarn from the bottom beam became inoperative.



Chain and Drawing-in Draft for Tuck Cloth

When the tuck is finished, the harnesses carrying the bottom beam yarn will commence to operate and this yarn will interlace with the first pick of filling that binds the tuck into the body of the cloth. It is very necessary that this first or

binding pick should be driven full up to the fell of the cloth, hence the reason why the bottom beam should remain stationary during the weaving of the tuck. If this is done correctly the tuck will lie flat on the face of the cloth and the back of the cloth will present an unbroken surface.

It is to be expected that during the weaving of the tuck, and owing to the take-up being idle, the cloth will have a tendency to beat back after a few tuck picks have been inserted. If the tuck is not too large this will have little effect on the correct running of the loom. In fact this will be of advantage in making a firmer tuck. Just as soon as the binding pick is inserted the cloth comes under full control again and remains under control for whatever length of body cloth is desired between tucks.

When drawing in the warps it is good practice to draw the first selvage on number 10 and 9 harnesses and the last selvage on 11 and 12 harnesses. Draw the warp yarn from the top beam on 8-6-4-2 harnesses and the yarn from the bottom beam on 7-5-3-1 harnesses. The reason for placing the selvage harnesses in the rear of the set is that the nearer the body and tuck harnesses are to the fell of the cloth the snappier the lift of the yarn.

The selvages should be drawn from the bottom beam and should weave plain all through the body of the cloth. They should be woven as a tape selvage during the weaving of the tuck. There would be too much contraction of the yarn in the selvage if it were woven plain all through the tuck cloth. When the selvage is weaving as a tape the contraction of the yarn is about one-half that of a plain selvage.

Kyanized Lumber

I note the word "kyanized" in a recent article in TEXTILE WORLD. What does this mean? It is referred to in a description of a new mill in which all wood is said to be kyanized. (4778)

Kyanized lumber is lumber treated with a wood preservative to prevent decay. The material used in kyanizing is bichloride of mercury, or as it is commonly known, corrosive sublimate. The ordinary method of treating lumber is to make a 1 per cent solution of the salt in cold water which is placed in a wooden or concrete tank that is large enough to permit submerging the lumber to be treated.

Iron tanks cannot be used because of the corrosive action of the salt upon it. The lumber is allowed to soak in the solution for varying periods of time, but the usual rule is one day for each inch of thickness, plus one day. For example this means that a 3-inch plank would soak four days.

We are of the opinion that this time is shortened somewhat when somebody is in a hurry to get his lumber. The only good way to shorten it would be to change the mixture by taking out one-half of the water and substituting one-half of denatured alcohol, which is a great accelerator of absorption by the wood of the mercury.

The lumber should be thoroughly air seasoned before placing in the solution as a better penetration is obtained. As the solution penetrates the lumber but a short distance below the surface, it will be seen that it is necessary to have all carpenter work performed on the lumber before treatment. If the carpenters have to cut the treated material on the job, it then exposes to the rot fungus the untreated wood.

It would be possible, of course, to treat the wood in such cuts by making up a solution at the job and soaking the cut portions in the solution, but this is expensive and slows up the work.

Knit Cloth Varies in Width

We have occasion to dye knit cotton net goods in the tubular form. These are dyed in a reel machine, extracted and dried over an ordinary tubular blower dryer. Complaint has been made regarding the variation in the width of these nets, the maximum being 49 inches and the minimum 45 inches. As these nets are piled up for cutting and subsequent processes, it means a considerable waste of material if the piles vary appreciably in width. It does not seem to me that this can be any possible fault of the dye operations and is strictly of previous manufacture. Will you advise if such a condition must arise from improper setting or operation of the knitting machines or variation in the yarn. (4769)

Such a condition might arise from the improper setting of the knitting machine. The cloth as it comes from the knitting machine should measure on the average a good 2 inches wider than the desired finished width to allow for shrinkage. The writer has never been able to find any reason why the dyeing should have any bearing on variations in sizes of cloth of this nature, as this operation is carried out in identically the same

way batch after batch. If the raw stock that goes into the yarn is changed, or the knitting machine is altered in adjustment it follows directly that the cloth after drying will also show a slight change.

As the cloth varies from 49 to 45 inches, a standard width size should be established and then as the cloth is about to be passed over the tubular blower dryer the proper sized spreader should be put in to bring this cloth to the standard width size after it has cooled down. This system may easily be worked out by a little experimenting with the cloth, and after it is once put into use by measuring the width of cloth just before it starts through the dryer, the operator by looking at his table will know which size spreader to have the particular roll of cloth pass over to produce the final desired standard size.

Plating Hosiery

We understand that you furnish your subscribers with technical information when desired. We are interested at this time in regard to plating hosiery. We desire to use fibre silk plating on mercerized yarn, and have done some little experimenting. We have not gotten the desired results, however. We are running 200 needle, 3½ inch, B-5 knitting machines and have tried 1-60s mercerized yarn as inside yarn, and plating with 160 denier artificial silk. This makes the number too heavy to be sold at a satisfactory price. We would like to have your opinion of the proper sizes of each yarn to use. Would you use 2-ply mercerized instead of the single ply? (4773)

We believe you will find 150 denier artificial silk more satisfactory for your gauge of machine with the 1-60s mercerized. We have been able to plate a little better with the 1-60s back than with a 2-60s yarn. For the above reason and since cost is the practical consideration we would use the 1-60s yarn.

Finishing Cotton Goods Samples

The writer would thank you to outline in detail with respect to chemicals used, proportions, etc., an effective method for completely removing sizing starch from cotton goods samples preparatory to bleaching and finishing by hand. I have reference only to small sample swatches of not over a yard in length, which I frequently bleach by hand in order to see the finished effect before the pieces are received from the finisher. The method I have been employing produces a

thoroughly satisfactory bleach but is stiff and harsh to the feel, due to the presence of sizing starch which does not seem to be entirely removed in the boiling-out process. My procedure is similar to that of the standard bleaching process on a small scale, being as follows:

The sample is first wet out in plain water and then boiled in a solution containing soda ash to 2 per cent. of the weight of the sample. This boiling is allowed to continue for about six hours. The sample is then removed, thoroughly washed in water and placed in a 2 degree Tw. solution (clear) of chloride of lime, where it remains until a pure white bleach is secured (usually about 45 minutes). It is then washed thoroughly once more and "soured" for four or five minutes in a 1 degree Tw. solution of sulphuric acid to remove the last traces of chlorine, and then put through a final and thorough wash in water. I notice that the sample stiffens perceptibly on the first wetting (doubtless due to the presence of sizing starch) and remains in this stiff, harsh state throughout all subsequent processes in spite of a six-hour boil-out in a soda ash solution as outlined. Any criticisms or suggestions you may have to offer with regard to this outlined procedure, especially in reference to the removal of starch, will be most welcome. (4776)

The process and chemicals outlined for bleaching cotton samples are right in every way. The only improvement would be the saturating of the samples previous to boiling out in a 2 per cent. solution of diastafor or in similar malt diastase for a period of two to three hours. This solution should be heated to about 160 degrees F. Afterward thoroughly wash the samples before they are boiled out. If the above method of procedure is followed the inquirer will find his samples free from sizing material after bleaching.

Handling Sizing Mixtures

Can you tell us what pumps are used and what piping is used in handling sizing mixtures of mills? At what temperatures are the materials mixed? (4767)

Rotary, centrifugal and belt driven plunger pumps are used for handling sizing mixtures. The rotary pumps should be brass or bronze and the plunger piston pump should be at least brass lined. All piping and connections should be brass, although in some cases galvanized iron is used.

In regard to the temperatures of mixing, it is of course understood that such materials as starch and dextrine are

thoroughly mixed with cold water before heating, then the mixture is brought to the boiling point. The time of boiling varies according to the materials present and the results sought. As it is important to transfer sizing mixtures from the sizing kettle to the size box as near the boiling point as possible in most cases, the mixtures which are pumped through the lines are usually very near the boiling point. This, of course, means that all lines through which the size is transferred should be well insulated to prevent radiation.

Dyeing Artificial Silk

A concern about to start the manufacture of knitted artificial silk goods would like information pertaining to the cleaning out of the oil used in the knitting process; also information regarding the dyeing, both the handling of the fabric and the character of the dyestuff used. We understand that most of this work is hand work, which makes it so expensive. Are there any books that treat of the processes used in dyeing these fabrics? (4772)

The removal of oil from artificial silk fabrics before dyeing is usually accomplished by means of a small amount of sal soda in warm water. The operation of oil removal is essentially one of scouring, and is done in washing machines, or in the dyeing machines. The end of the cloth is thrown over the winch or roller, while the main portion is immersed in the scouring liquor. This scouring operation requires some little experience and watchfulness, so as not to injure the fabric by overworking. After scouring, the fabric is rinsed in clean water, when it is ready for dyeing.

To dye artificial silk material in the piece requires that the dye house be equipped with regular cloth dyeing machines. The actual dyeing is not difficult, but the handling of the fabrics afterward requires special machines and dryers. No two plants operating on these goods are identically equipped, and it would be well to connect with builders of tricot finishing machines for the ideal equipment for your class of goods.

Regarding dyeing, the colors to be used will be selected from the direct group, with which almost every shade is to be obtained. Dyeing is usually carried out with Turkey-red oil and Glauber's salt for medium and heavy shades. Dyeing light shades usually proceeds at from 100 to 120 degrees

F., while for heavy shades the temperature of the bath may go to 180 or 190 degrees F.

In dyeing artificial silk the dyer must expect to encounter certain unevenness from time to time, and for which no satisfactory explanation has as yet been advanced by the manufacturers of the silk. It has frequently been noticed that artificial silk varies to such an extent that the dye does not produce level shades. Formerly this condition was credited to the dye as not going on the silk evenly, but it is believed that this unevenness in many shades is due to some property of the artificial silk, which the manufacturers have not yet succeeded in overcoming. These facts are to be noted so that due regard for minor troubles that may appear can be disposed of. As a rule, unevenness in dyeing artificial silk piece goods is less frequently noticed than in skein yarn.

No book treating particularly of dyeing hosiery and knit goods has been published, but a small and comprehensive manual was issued a year ago by the National Aniline & Chemical Co. exclusively on this subject, and is worth asking for.

Wearing Qualities of Blankets

We are writing for information as to the wearing qualities of woolen blankets made of strictly all virgin wool warp and filling as compared with a blanket made of 85 per cent. shoddy wool filling and cotton warp. (4786)

It would be quite impossible from the meagre specifications that you furnish for two kinds of blankets to give you an opinion that would be of any value. The fact that a blanket or other fabric is "strictly all virgin wool warp and filling" is no certain index of its wearing quality, for there is almost as much variation in strength and other properties between different kinds of virgin wool as there is between different kinds of shoddy and of cotton. Cotton warp blankets may be superior in wearing qualities to blankets made entirely of previously unused wool, and their equal in heat-retaining qualities. The same might be true of a cotton warp blanket that carried 85 per cent. of shoddy in the filling, although this would hardly be probable, as it is to be presumed that the shoddy would be introduced to cheapen the fabric and might be expected to be of shorter and weaker stock than any so-called virgin wool that might be used.

Removing Odor from Artificial Silk

We will appreciate it if you will inform us the cause of the bad odor in this silk of viscose. We are having considerable difficulty with this odor, as our dyers are unable to wash this smell out of the yarn entirely. This happens mostly in white, especially bleached white and black; the other colors being free of this odor. We do not know just what chemicals are used in dyeing this silk, as it is done by commission dyers, but we do have this difficulty with the colors mentioned, and if you can suggest a way to ascertain the cause of this odor or remove it, we would be glad to be informed. (4777)

This artificial silk has been finished with an oil, and it is the oil used that imparts the odor complained of. The odor seems to indicate that one of the commercial soluble oils has been used. These oils are made from castor oil and its peculiar smell is to be noticed on this skein. If the black as dyed on this silk will stand a weak solution of carbonate of soda such as sal soda (or one of the mono-hydrates commonly used) it is suggested that the skeins be passed through a warm solution containing about 3 per cent. on the weight of the silk. By this treatment all or nearly all of the odor will be removed.

Soluble oils are sometimes used directly in the dye bath to assist the dye going on level, while at other times the oil is used in a supplementary bath so as to serve as a finishing or dressing, and to impart a soft feel or handle. In the present case it is thought that the oil was used as a softener.

Softeners for Bleached Cotton Underwear

Can you supply me with detailed information regarding softeners used for bleached cotton underwear, including the different materials used for softening the goods and method of applying them? At what point in the process of finishing underwear are they used? What quantities are employed and just how are they applied to the goods? (4760)

Softeners used for bleaching cotton underwear are commonly made from a soap base. The composition, however, may vary greatly. Some are nothing but a jellified tallow soap made by boiling a good tallow curd soap with water; others may be better made and contain other ingredients besides the soap. Some softeners appear to have a vogue for a time, then they disappear from the market and other

take their place, perhaps in turn to be displaced by another preparation. The following formulas give details of the preparation of some of these soap softeners:

1. Take 25 pounds good white tallow soap, cut into thin shavings, add 7½ gallons water and boil until the soap is dissolved, then allow to cool. When nearly cold stir well until the soap sets.

2. Weigh out 12 pounds tallow and 8 pounds lard, mix with 2 gallons water, heat until the fats melt, then add 3 pounds, 98 per cent. caustic soda dissolved in 2 gallons of water. Boil until the fats are saponified, then add sufficient water to make 10 gallons of soap paste. Allow to cool and then stir until thoroughly cold.

3. Take 30 pounds cocoanut oil, melt over 3 gallons water and add 5½ pounds 98 per cent. caustic soda dissolved in 2 gallons water. Boil the mixture until the oil is saponified. Add sufficient water to make 10 gallons and allow to cool, stirring well.

4. Take 30 pounds cocoanut oil and 5 pounds tallow and saponify with 6½ pounds of caustic soda as above. Add water to make 10 gallons and 5 pounds powdered French chalk.

A softener should be made of such materials that it is unaltered by heat or cold, cannot become rancid, will not allow goods to become hard or cakey on long storage, will not impart any color to cloth, and can be used in any textile operation where softening and lubricating effects are required. For these reasons it is necessary to make softeners from good fats like tallow, lard, cocoanut and palm oils that make white soaps. Care must be taken to make them neutral. In the preparation of the better grades, some makers add such materials as spermaceti, paraffin wax and Japan wax.

The softener is best prepared for use in water by placing the quantity desired in a pail or small tub, and pouring over it several times its volume of water of a temperature of about 180 degrees F. This concentrated mixture may then be added to the regular bath into which the underwear passes.

For cotton underwear 2 to 8 per cent. of the softener on the weight of the goods is taken and put into the last rinse water. In most all cases the softener is added to the bluing tub, which is the last bath in the process of bleaching. The length of time the underwear cloth is allowed to remain in the bluing is long enough for the cloth to be in the softener.

Where a continuous process of bleaching is employed, the percentage of softener required, based on the weight of underwear in a box, is added to the bluing tub, and as each box of cloth passes through, a volume of the softener is added from the concentrated mixture equal to the percentage desired to put on the cloth.

Oil Spots in Cotton Bales

When we were opening some bales of cotton a few days ago we were surprised to find oil spots in the middle of the bale. We called this to the attention of the dealer who sold us the cotton and he could not account for it and insisted that there was no way by which these machine oil spots could get into the middle of a bale of cotton, nor could they come from the gin. He thought they must have been due to some carelessness in the mill. What would you say about it? (4803)

It is possible for oil to get into the cotton in the gin press, although it does not often happen. Sometimes oil spots in the bale are caused by the tramper (machine used to temporarily pack the cotton in press) having too much oil or grease applied. This will cause black oil spots. Another way is where a press has a hydraulic tramper and uses oil to force the tramper down. As a rule the hydraulic tramper is an automatic machine and if the automatic trips are not properly set so as to reverse the hydraulic piston, the pressure forces oil by the stuffing box and this oil drips down into the bale and causes the trouble of which you complain. It might be difficult to trace cotton back to the gin where it was ginned and pressed, but you should insist upon the dealer doing this to avoid repetition of the trouble.

Shading in Mixture Wool Yarns

We are submitting two samples of yarn and stock from which the yarn was made. You will notice we are having serious trouble with shading and have attempted by the process of elimination to arrive at the cause of this but without success. One package contains some brown yarn with the mix; the other contains green yarn with the mix. There are also two samples of the green yarn as it should be. We know of no change in our organization and cannot trace the trouble at all, but are inclined to believe that the

trouble is in the shoddy. We dye our own shoddy at the mill. The trouble is holding up our production. Can you advise us at once how we can correct it? (4793)

This is undoubtedly an important and serious matter. The green yarn results from mixing white, black, yellow, dark blue and dark green stock. The shading complained of is a bright green band due to uneven mixing of the yellow portion, since a microscopical examination of the thread from this portion shows an excess of yellow. As to the brown yarn, the same condition is plain, there being a rather large and distinct band of the dark reddish brown wool showing quite prominently.

The stock of each shade appears to be well dyed, and the only reason for the difficulty seems to be incomplete distribution and mixing of the several colors. In a five-part mix, such as the green, the greatest care is necessary in making the addition of each colored stock so as to avoid any possibility of lumping, which often is the direct cause of this kind of unevenness. The same remarks apply to the brown yarn; here is distinctly seen the result of a lump of dark reddish-brown passing over the cards before it has a chance of being distributed and mixed with the other two colors. In our opinion, the job of mixing looks as though it had been hurried, and not sufficient time allowed for the colors to be thoroughly incorporated. We do not know how much oil was used on these mixes, but from the handle would suggest that the amount be somewhat increased to insure better lubrication.

Lines in Plaid-Back

I am enclosing herewith a plaid-back coating. Could you tell me how such a finish is put on? At first glance I thought the vertical lines resulted from a weave formation, but if you will notice on a corner where I have burned off the finish, the weave is the four-harness twill. (4800)

A boss finisher in a large fancy goods mill thinks the finish is obtained by using a double acting napper. We incline to the opinion that although the weave is the double four-harness twill, the rib stripe is formed by the binding or stitching plan employed. It is common practice when binding double cloths to distribute the binding points in some definite order, such as a twill or sateen, so as to distribute them evenly throughout the cloth and not interfere with the face and back weaves or form any kind of pattern on the face or back.

In the sample sent by the inquirer just the reverse of this practice is followed; the binding or stitching points between the face and back cloths are arranged to influence the effect on the face of the cloth and give the vertical lines shown. The effect is developed in the fulling and napping and obliterated when the nap is removed.

Goods Weakened in Printing

Enclosed please find three samples, including a striped print and a dotted print. Both of these are weakened in the printing; the dot more so than the stripe. These have been made up into children's garments and have been washed several times. We also enclose a green cotton cord. The customer complains that when crocheting, the dye colors her fingers and in a short time causes an uncomfortable feeling in her nose and mouth, and after a couple of hours she has a bitter taste in her mouth and throat and a feeling of nausea in her stomach. We would be glad if you could throw any light on the subject as to cause, etc. (4789)

These samples of cotton cloth have been dyed with indigo, but it is regretted that no information is given as to the method used for their printing. The dot or stripe may have been first applied to the cloth in the form of one of many of the "white resists" used by indigo printers, before the goods passed through the indigo solution; or the dyed cloth may have been afterwards printed with a "white discharge," and the dot or stripe produced during a subsequent steaming. The action of some chemical used in the resist or discharge undoubtedly caused the cotton to weaken, a result that is sometimes encountered when the conditions are not carefully observed in the preparation of the printing pastes.

Regarding the small sample of green dyed cotton thread used for crocheting, this has been dyed with a basic dye, in all probability brilliant green. From the fact that it readily crocks or rubs off, as a simple test shows, we are led to believe that the skeins were not as thoroughly washed after dyeing as they should have been. As to the bitter taste and nausea experienced by the user of this yarn, it should be observed that some persons are quite susceptible to fine dye dust, while others are not, and it is possible that this is one of those instances.

It should be also noted that basic dyes are applied to cotton with the aid of an antimony mordant fixed on a bottom of

tannic acid. It may be that in the present case the tannin-antimony mordanting has not been thoroughly done, and that it is the fine antimony dust and not the actual dye dust that causes the person to feel ill. The common antimony salt used by dyers is tartar emetic, and as its name implies, is the direct cause of the nausea. The trouble is evidently in the dye house where the yarn is prepared, and a matter of such importance should be taken up directly with the dyer. The small sample shows unmistakable evidence that the fixation of the mordant, and consequently the dye, has not been complete.

Carding Long Wool

Please find enclosed a small sample of stock (all wool). I am trying to run this on a set of 48 inch cards (60 ends). The wire on the finisher card is No. 34. I am having a lot of trouble on the top ring doffer. The fancy being set to clear the cylinder throws the long coarse wool on the narrow rings and leaves the condenser just like a spider's web, consequently giving me trouble on the top spools, the ends breaking, running double, and also making bad work for the spinner by reason of the long hairs lapping over the roving.

Now I would like to know your opinion of this stock. I might say here that the cards are cotton waste cards. The staple of the wool runs from 3 to 10 inches. The carbonized wool just goes through the mixing picker and is not opened up. The quality of the stock is 46s. I think the stock is too long to run on these cards. The batch is made up as follows:

Carbonized wool	65 pounds
Slipe wool	55 pounds
Wool noils 46s	50 pounds
Wool waste	30 pounds
	200 pounds

If I run the fancy any slower the stock loads on it. Would you kindly let me know what you think of this stock and if you could suggest anything that would remedy the trouble, I hope you may be able to help me out in this matter. (4788)

The long wool as shown in the sample is too long a staple to run successfully on the 48-inch cards, 60 ends, as the rings are too close together for such long hairy stock. However, it might be well to try a long straight tooth, open set fancy, at a speed just a little more than the speed of the main cylin-

der. It seems advisable to run the long wool through a burr picker in order to break it up as much as possible. This stock should work satisfactorily on 48 rings instead of 60.

Degumming Silk

Could you please tell me the reason why the silk knitted web marked No. 1 did not degum, while No. 2 is soft and seems to be totally degummed? Both are out of the same batch, but whether from different shipments of silk we are unable to tell. Our degumming is done with olive oil soap. We have tried other soaps but with no better results and are at a loss to account for it. (4810)

In dissecting the thread of sample No. 1, we find it is a 12 thread with 4 turns right twist. Sample No. 2 is a 12 thread with 4 turns left twist. The difference in the direction of twist indicates without doubt a different silk. While sample No. 1 is stiff and appears to indicate that some of the gum is still left in the thread, it is found on separating the threads that the gum appears to have been all removed and that the yellow discoloring is due to a stain that might have been given the silk by the oil used in soaking, or added in some unknown way afterwards. It is suggested that the trouble be traced to its source by sending a few skeins or cones to the U. S. Testing Co., Inc., 340 Hudson street, New York, asking for a boil-off test on the silk before and after knitting.

Different Shades in Dyed Stockings

Enclosed you will please find two stockings. I would like to have your opinion as to what caused the two different shades. They were degummed with a boil-off oil at the same time in the same bath, and were dyed in a neutral bath using direct dyes. The dyeing ran at 212 degrees for one hour, rotary machine. We do not figure the machine was overcrowded, having but 135 dozen or 169 pounds for the 200-pound capacity machine. These stockings were two of several taken out of the same pocket for a test. Would the degree of looseness of the knitting have such an effect? Any information you might be able to give us on the subject will be greatly appreciated. (4790)

With the conditions as stated in the inquiry it seems that there is a possibility of the temperature of the bath having been raised to 212 degrees F. too quickly, causing some of the stockings in different parts of the machine to take the

dye at different rates and consequently to show up unevenly in the pockets. In dyeing such light and delicate shades as shown by these samples it seems to be the best practice, after the stockings have been degummed, to wash thoroughly, enter the dye bath properly filled with water at the start, and then to add the dissolved dyestuff gradually as the temperature rises. This method will insure evenness throughout the batch.

There is also a possibility that some of the stockings may have been knitted on different machines where different oils used for lubricating have some influence on the shades, but in the present case this theory does not seem to hold.

We suggest in future lots, however, after being assured that the degumming is completed, to run off the machine, rinse in warm water containing a small amount of carbonate of soda, run for 10 to 15 minutes, run off, rinse and proceed with the dyeing as outlined above. Varying degrees of looseness are quite likely to have an influence on the shade, as is also any irregularity in the twist of the yarn. Quite recently there have been brought to the attention of the writer a number of off-shades in light colors that were due directly to inequalities in the yarn.

Numbering Spun Silk

What is spun silk and what system is used for numbering the yarn counts? (4809)

Spun silk is real silk which it is not possible to manufacture into thrown silk yarns due to the fibres being non-continuous. The method of numbering spun silk yarn is the same as for cotton yarn; which is on the basis of 840 yards to the hank. If 840 yards of spun silk weighed one pound, it would be number 1. If ten times 840 yards weighed one pound it would be number 10, and so on.

Finishing Cloth With Cotton Warp and Artificial Silk Filling

I would like to obtain your opinion on finishing the piece of goods which I am enclosing. You will note that this cloth is woven with artificial silk filling threads and a cotton warp. Our problem is to work out a method for bleaching and finishing without injuring the filling threads. We feel confident that we will be able to bleach the cloth without any trouble, but are not quite as sure when it comes to

finishing. After coming up from the bleach house, the goods will have to be dried preliminary to dyeing them a pink shade and then the cloth will have to be framed out on the tenter frames. This is where we are undecided just how to handle the cloth and would appreciate any suggestions that you may be able to give on this matter. Perhaps you have in mind some material that can be used to increase the strength of artificial silk when it is wet and thereby allow the stretching operation to go on without injuring the fibres and this would be a good point to try. (4818)

The writer believes that the concerns handling this product most successfully are bleaching by the peroxide process, handling the cloth as little as possible; that is, doing all the bleaching in vats by pump circulation, afterward washing through the same pump circulation and opening by hand.

The dyeing of light shades is being done on 2-roll padders. A concern that is having little or no trouble with this class of goods is running them at something less than the old high speeds used for cotton goods and taking them to the tenter direct from the pad without putting them over drying cylinders, using a large volume of air and keeping the temperatures below 190 degrees F.

The writer knows of no material for strengthening the artificial silk when it is wet which would not interfere with the finishing of soft finished goods. The inquirer must remember that these goods cannot be processed on the tenter frame to the extent that cotton goods are processed. All that can be expected is to keep the filling threads straight, and a shrinkage of at least 1 to 1½ inches in width on a yard wide fabric should be allowed for.

Finding the Gauge of Stockings

Will you please illustrate the method employed for finding the gauge of stockings, working with the finished product? Kindly assume any conditions which you may think to be typical. (4806)

We would first determine the number of needles used in making the stocking desired, either by counting with the aid of a good reading glass, or by putting the stocking on a transfer having a known number of transfer points.

Then we would look up a table of gauges and numbers of needles used. We believe the following table closely ap-

proximates an average of the usual practice of knitting machine builders. The following is for size 3¼ inch machines:

Gauge	Needles
10	48 to 72
12	76 to 92
18	96 to 108
24	112 to 124
30	128 to 144
42	148 to 180
48	184 to 200
50	200 to 240
54	260

These are the gauges in most common use. However, if your sample was coarse and heavy, the hooks of the needles might be a gauge heavier, as for instance, instead of 48 gauge needles they might be 48-42, being 48 gauge needles with 42 gauge hooks. For a very fine stocking 48-50 gauge might be used, or 48 gauge needles with 50 gauge hooks.

An experienced knitter can tell quickly what gauge should be used and most stockings can be quickly identified by some peculiarity of construction common only to a certain make of machine.

Dyeing Worsted Yarns

For the last few months I have experienced considerable difficulty in obtaining level dyeings on our twisted worsted yarns, size 2-26s. Since I get good results on all lower counts, 2-10s, 4-8s, etc., it is a question of proper scouring and it is in this regard that I seek your advice. I carry out a practice which is common enough, I believe, and that is scouring and dyeing in the same machine, capacity 250 pounds, not metal lined. I intend recommending that the firm line this with copper or monel metal. Which of these would you recommend? (4798)

This is a rather serious question and it will be well to investigate thoroughly before a definite conclusion is reached as to the cause of the trouble. It may be that the cause is due to imperfect scouring of the yarn before dyeing. This can be ascertained by taking a sample lot and subjecting it to a thorough scour in the machine, then running off the scour liquor, rinsing well and then proceeding with the dyeing.

In scouring worsted yarn the problem is to remove all the dirt and oil that it contains and to do this successfully means whatever detergent is used to loosen this dirt and oil must

be removed by thorough rinsing afterwards. The scouring can be effected in a dyeing machine, provided that sufficient time is given, and the volume of liquor is ample to manipulate the skeins in. Another point to be kept in mind is that the water used should be as soft as possible. If hard water is used, insoluble lime soap will form in the scour and attach itself to the yarn. When this occurs, uneven dyeings will surely result.

The chief point to observe in hank scouring is not to overload the scour liquor with soap. Too much soap is equally as bad as too little. Only sufficient soap should be used to maintain a practical working lather. Regarding the lining of scouring and dyeing machines with metal, both copper and monel metal are good, and considerable attention has been given recently to the last named, which seems to lend itself admirably for textile machinery.

Summing up, we suggest that you scour the yarn in plenty of water, use good quality soap, a little carbonated alkali, keep the temperature between 110 and 120 degrees F., and allow sufficient time for the detergents to do their work, then rinse well before any thought of dyeing is made.

Average Counts of a Warp

Will you please figure this example for me: What are the average counts of the yarn in a warp with the ends arranged as follows: 34 ends of 48s and 1 end of 2-ply 20s. I want it run to five decimals. In other words, want five figures in the answer. (4854)

The inquirer has used a rather unusual form of putting a question of this kind. We are assuming that the question calls for the average counts of the yarn and not the counts of the cloth, because it does not state that the number of threads mentioned lie in one inch. The manner in which the calculation is made is as follows:

Divide each number of ends by its own counts; the result equals the relative weights. Then add the weights and divide into the total number of ends.

34	divided by	48 =	0.70833
2	divided by	20 =	0.10000
36			0.80833

36 divided by 0.80833 = 44.536+

The inquirer can carry out the division to more decimal places if he wishes, but the yarn is practically 44½ average counts.

Elasticity in Finished Double Cloth Webbing

I am sending you herewith sample of finished and unfinished webbing. The stiffer feel of the finished webbing is about what we want, but you will note that it does not have the elasticity of the unfinished sample. What is this loss of elasticity due to? Is there anything we can use in the finishing mixture to retain the elasticity? (4797)

In sizing and finishing webs of a double-cloth construction, such as the sample submitted, where the percentage of rubber is small, the process is diffierent to that employed in finishing lisles and webs of a similar character which have no face or back, or nothing but the weft to cover up and protect the strands of rubber. Here there is a long stretch when the goods are taken from the loom, and it is likely to be increased to such an extent by the action of steam and heat in the finishing process that it becomes necessary to use a sizing solution of gums, glues or gelatines, so as to prevent this excess of stretch, and at the same time give satisfactory body and firmness to a somewhat thin web.

On cushion back webs, however, the conditions are different and it requires an altogether different process of finish. The goods are thick and heavy, the weave open and the yarns used are soft and absorbent, while the percentage of rubber used is relatively small. Here it becomes necessary to avoid all sizes of a sticky or glutinous nature and to use sizes of starch only, which will give the desired body and cross-section firmness by acting as a filler without locking the warp fibres together, and thus decreasing the elasticity.

The size should be applied hot so that it will penetrate below the surface and thus prevent any liability to baking when it strikes the hot cans, and also any harshness of hand. The size should be kept uniformly hot in the pan, which can be accomplished by having a small steam pipe running through it. The lower nip roll should run in the size bath and the goods be fed into the nip rolls so as to allow the size to go on the back of the webs only.

On the sample submitted the face also appears to have been sized. This is not advisable, inasmuch as the close face weave, when sized, has a greater tendency to prevent the free action

of the rubber than when the size is applied to the weave at the back. It will be found advisable to pass the goods through a covered steam chest before they reach the drying cans in order to soften the yarns well.

It is also important that the goods be fed into the machine without being stretched, and further that arrangement be available to get a somewhat diminished speed on the cans at the delivery end from that at the entry end so as to permit proper shrinkage before goods are "set." This is generally accomplished by having the cans driven in two distinct sections and using a cone pulley between the two sections so as to allow for a variable speed.

Scrooping Cotton Yarns

What chemicals and process would you advise for the best results in scrooping mercerized cotton yarns following the dyeing of the same? (4813)

A scroop may be imparted to mercerized and plain cotton yarns by working the skeins for a few minutes in a cold or lukewarm bath of water containing ¾ pound of olive oil soap for each 10 gallons; lift and drain. Now enter the soaped yarn in a cold bath charged with 3 to 8 ounces of formic acid (85 per cent.), for each 10 gallons. Acetic acid may be used for the purpose, but formic acid is better. If acetic acid is used the amount will be from one to two pounds. Substituting tartaric acid—a crystal acid—a more permanent scroop will be obtained, but no scroop, however obtained on cotton, will be permanent in the sense that it will remain on the yarn after the latter has been put through a wash.

Scroop depends upon the presence of free vegetable acid. After the yarn has been immersed in the acid bath, it is lifted, allowed to drain and then dried at as high a temperature as possible, but without injuring the cotton. True scroop is a physical property of clean silk, but is enhanced by the judicious use of some vegetable acid, hence the use of such acids on cotton. Silk scroop is permanent as long as the silk is in prime condition.

Twisted Tails or Cords in Cotton

We occasionally find in a bale of cotton what seems to be twisted cords or pigtails and we have wondered what caused them. Can you enlighten us? (4804)

These twisted tails or cords are formed in the trunk con-

veyor which carries the cotton from the gin to the press. If there is a slight roughness or protuberance on the sides of the trunk conveyor, some of the cotton fibres will catch and the action of the air tends to twist them. As more and more fibres accumulate they gradually acquire the form of the cord or pigtail which you speak of. This action goes on until the pigtail is heavy enough or big enough to pull off, when it is carried through with the rest of the seed cotton. Then the process begins over again. This can be remedied only by careful inspection of the trunk pipe and sand papering or smoothing off all roughness which is likely to catch the fibres.

Plating Artificial Silk Over Mercerized

We have just started to make half hose of artificial silk plated over mercerized. Our machinist and the writer are both green on this work. Would be glad to have some general information on plaiting. How should the sinkers be set for this work? (4821[1])[1]

If your machines are seamless, as we infer, we would advise that you do not try finer than 150 denier artificial silk unless the machines are very fine. This yarn must be wound carefully and if it must be conditioned use olive oil emulsion very sparingly. You can use enough emulsion on the mercerized yarn to secure results. You will have the best results with short bobbins of about 3 inches diameter at the base.

The take-off eye over the mercerized yarn may be set at any convenient height on the knitting machine, but the take-off eye for the artificial silk should be set so that the yarn will always swing away from the bobbin in a single balloon. This is best accomplished with a low eye.

We would recommend a compensating tension for the artificial silk. You must be very careful that the ends do not catch against any projections which would disturb the even tension which is required for successful plaiting. The ends should be well separated as they pass from the throat plate to the needle and a short lead is usually preferable to a long one at that point, because there is less danger of crossing the yarns.

We have had the best success with the sinkers advanced as much as they can be without disturbing or lengthening the stitch with them. Some machines advance for the plaiting and then drop back for the heels and toes.

Uneven Knitted Web

Enclosed find samples of fabric marked A, B and C. You will note that they all have a rough or uneven appearance. Will you be kind enough to give us your opinion as to what causes this flaky appearance? (4780)

The samples of cloth are made from very uneven yarn, which gives them the rough appearance complained of. In samples A and C there are both light and heavy spots, the latter being more continuous and probably caused by one end of the heavier yarn. The fine places are shorter and are merely those found in most lower grade yarn. Sample B represents uneven yarn only. If a better grade of yarn is used, or at least a yarn that runs more even in size, it will probably overcome the trouble. This condition may be aggravated by unevenness of stitch. The stitchers should be looked to and if they are all right good cloth should result if good yarn is used.

Calculating Percentage of Size on Warps

Which is the proper way to figure the percentage of sizing on warps? Say the yarn weight from the warpers is 1320 pounds and after being dyed and dried and beamed it only weighs 1280 pounds. Is it right to use the weights from warpers before the yarn is dyed or is it right to take the weights after being dyed, dried and beamed? I find by using the warper weights that I have a variation in the percentage of size on the warps; but by using the weights after the yarn has been dyed, dried and beamed I get a more even percentage of size. Any information that you can give me about this will be appreciated. (4808)

The proper way to figure the percentage of size on warps is to weigh the yarn just before putting the set in the slasher and use this weight as a basis. For example, we will assume that your yarn after being dyed, dried and beamed weighs 1280 pounds. Now put the set in the slasher and run it over, saving the yarn in front from the knots. After you have counted the set in and are ready to start, you may have to waste the yarn from the size box to the front of the slasher on account of the size mark; if so, save this also. Have all the empty loom beams weighed before they are put on the machine to be filled up.

When the set is out you will no doubt have a little waste left on the back beams, say about three pounds. Subtract

this amount from the total of 1280 pounds, which leaves 1277 pounds. Put in your next set and run it over so that you can get the waste up to the knots. Now weigh all the sized waste that you have from the beginning end and finishing end of the set. Weigh all the beams from the front and get the net weight of yarn on them. Add the weight of the sized waste to this amount, which will give, say 1341 pounds as the total weight of yarn sized. Subtract from this the weight of yarn you started with, minus the waste, which is 1277 pounds. Then calculate the percentage of size added.

1341—1277=64, weight of size added.
64÷1277=.05 or 5 per cent. of size.

Carding Mohair Mixture

I am sending you sample of stock I am having a lot of trouble with in spinning. It is a mixture of 25 per cent. mohair, 25 per cent. wool and 50 per cent. noils. I pick the mohair first, then the wool and noils, and then blend mixing, picking twice after this. I run it 205 grains, 50 yards. Reeling on cards it varies a lot in weight, anywhere from 195 to 215 grains. I use 13 quarts of oil to 100 pounds, mixed 3 to 1, and 3 ounces of alum. The spinner runs it 126 grains. I would be pleased to know how this stock ought to be picked, oiled and handled, or to have any information you could give to better it for me. (4794)

The wool is extremely harsh and seems to have undergone treatment with a strong solution of alkali in scouring. This in connection with the natural harsh nature of mohair makes the blend difficult to card and spin successfully unless it is thoroughly and evenly moistened, which would require at least 16 quarts of emulsion to 100 pounds of stock of a 3 to 1 solution. Also the appearance of the roving indicates a poor working fancy. Cut the speed down and set it on very lightly. Make the weight of the roping 195 grains on the card and rub it harder.

Production on Wool Yarns

What in your opinion is a fair 9-hour day's production for a spinner working on good running 1⅛ run work and 2⅝ run work based on mules of 288 and 360 spindles. I

would also like to have your opinion of a fair day's spooling production on the same classes of work. (4825)

In spinning, with the yarns spun medium twist, the production should be approximately as follows:

1⅛ run, 360 spindles.....540 pounds
1⅛ run, 288 spindles.....400 pounds
2⅝ run, 360 spindles.....325 pounds
2⅝ run, 288 spindles.....250 pounds

In spooling you should get about the following production under favorable conditions:

1⅛ run.....400 pounds
2⅝ run.....250 pounds

Resultant Counts of Silk, Worsted and Cotton Yarns

Please advise us regarding the following:

(1) How much boiled-off 4-thread 13/15 denier Japan in weight is required for one pound 50s-2 white worsted yarn when this is twisted in the following combination:
1 thread of 50s-2 worsted together with
1 thread of 4-thread boiled-off 13/15 Japan
4½ turns right twist per inch.

The boiled-off silk has four turns right twist in it already. The twist in the worsted yarn is the same as that of the enclosed skein. Also, in this combination yarn, what is the proportion per pound, finished weight, of worsted and also boiled-off 4-thread silk?

(2) How much boiled-off 3-thread 13/15 denier Japan in weight is required for one pound 50s-2 white worsted yarn when this is twisted in the following combination:
1 thread of 50s-2 worsted together with
1 thread of 3-thread boiled-off 13/15 Japan
4½ turns right twist per inch.

The boiled-off silk has four turns right twist in it already. The twist in the worsted yarn is the same as that of the enclosed skein. Also, in this combination yarn, what is the proportion per pound, finished weight, of worsted and also boiled-off 3-thread silk?

In answering the above please assume that the moisture content of the silk, wool and cotton is that of the standard regain. (4819)

(1) The answer to this question is worked out as follows: 50s-2 worsted yarn is equal to single 25s in size, and this size, or number, means that 25 skeins will weigh one pound. The nominal length of worsted yarn skeins is 560 yards. Hence, 25 skeins would give a yardage

per pound, if the yarn was spun exactly to count, of 14,000 yards. The compound thread is to be twisted to the right with 4½ turns per inch, and as this twist is in the same direction as the two-ply twist of the 50s-2 worsted yarns, it follows that there will be a shortening of both the threads in the compound yarn in this process of twisting. How much this will be depends somewhat upon mill conditions such as the tension that is put upon the yarn, etc. As an estimate I think that 5% will be on the safe side. Hence, after twisting, the worsted yarn would be 5% shorter, equal to 700 yards, leaving a net length of 13,300 yards per lb.

A 13/15 denier raw silk thread, averaging 14 deniers, will run about 319,000 yards to the lb., and four threads doubled together would be ¼ of this, 79,750. This is the length per pound of the raw silk with the gum in it, but your inquiry is based upon the length of boiled-off thread.

The boil-off will vary from lot to lot. White Japan may run from 17% to 21%, and yellow Japan from 20% to 25%, and sometimes even more, or less, than these figures. If the silk is white Japan, we might take an average boil-off of 19%, which after boiling off would leave 81% remaining for the fibre with its ordinary content of moisture. Consequently, the 79,750 yards per lb. will be correspondingly thinner, so this figure must be divided by 81 to get the boil-off length per pound, which would work out at 98,457 yards per lb. As this would also shorten in the twisting with the worsted yarn to a similar degree, it would follow that after twisting the length of the thread in the compound yarn would be 5% less, giving a yardage per lb. for the boiled-off silk thread which enters into the compound yarn, of 93,534. Of this thread, 13,330 yards would be required for twisting with the worsted yarn, so that it would require $\frac{13,300}{93,534}$ lbs of silk, equalling 0.14 lbs. The compound yarn in which the worsted runs 13,300 yards per lb. will now weigh 1.14 lbs., so that the average length of the yarn thus secured will be 11,667 yards per lb., equal in size to a worsted yarn of single 21¼s, or 43¼s-2. The proportions of worsted and silk in this compound yarn are as follows:

Worsted 87.72%; Silk 12.28%.

(2) A combination of three-thread tram with 50s-2 worsted yarn would be figured in the same way, and as the silk is fine

compared with the bulk of the worsted yarn, the take-up, or shortening, would not vary much, so 5% might be allowed here also. The amount of boiled-off silk required would be .11 lb. as against .14 lb. for the four thread. In this case, after twisting, the weight of the compound yarn would be 1.11 lbs., as compared with the basic one pound of worsted yarn reduced to 13,300 yards. This works out at an average length of 11,982 yards per lb., equal in size to a worsted yarn on the light side of 22s or 44s-2. The proportions of material in this compound yarn are as follows:

Worsted 90.09%; Silk 9.91%.

Conveying Cotton by Air Drafts

Would like to know if you have any book taking up the conveying of cotton through pipes by air drafts, or could give me any information on how to calculate the amount of cotton a certain size pipe will carry with a certain size fan driving. Also, is there any constant figure for the weight of a cubic foot of cotton, say dropped loosely from an endless belt overhead into a bin? Would greatly appreciate any suggestions as to references to books or any information that you may see fit to give me. (4840)

There is no book outside of the catalogs of machine builders, we believe, which discusses this subject. We are sending the inquirer under separate cover a copy of the picker catalog issued by Saco-Lowell Shops, Boston, Mass. On page 27 of this publication there is a table showing the size of piping and fan recommended by Saco-Lowell Shops for various amounts of cotton and for various lengths of draw. In regard to the weight of well opened cotton, it has been found safe to figure 2 pounds per cubic foot, this being the average of a number of bins that have been tested.

Dyeing Developed Black on Yarn

Would you kindly advise me as to the best process to use in finishing the enclosed blacks. You will note that these skeins are two shades and that the luster of one is very good. These have been taken from different dyeings, although they are the same grade of stock. The black is developed and given a monopole oil bath. Would it be possible for you to inform me in reference to a formula for dyeing this black and the method to use in general for finishing? (4839)

The fact that two different shades of black appear on skeins from separate dyeings is by no means out of the way since

the dyer may have either made a change in his process or may have experimented with a new combination. Then again, there may have been a difference in the quality of the yarn, which seems to be plausible.

The process for dyeing a developed black on yarn is as follows: For 100 pounds of yarn, the bath is charged with from 5 to 7 per cent. of developed black, and about 30 pounds of common salt. The yarn is turned for 1 to 1¼ hours in this bath with the temperature at or near a simmer. Actual boiling is unnecessary. When the yarn is dyed it is lifted and washed, and then worked for 15 to 20 minutes in a fresh cold bath charged with 3 pounds nitrite of soda and 7½ pounds muriatic acid (32 degrees Tw.). This second bath treatment effects a chemical change in the black without materially altering its shade. The yarn is lifted from this bath (which is run off), rinsed quickly and passed into a fresh cold developing bath charged with 1 pound of a suitable developer which may be beta naphthol, metatoluyene diamine, or para phenylene diamine in the presence of half its weight of caustic soda or soda ash. This third, or developing bath, fixes or develops the shade and makes it fast to washing, etc. After developing the yarn is washed well, soaped if necessary, or given whatever kind of finish is deemed essential. Most dyers of this kind of yarn make use of monopole oil or other good quality of soluble oil for the purpose of imparting a degree of softness to the yarn and to improve its lustre.

If this reply does not supply the precise information desired, advise us and make your inquiry more complete.

Baling Cotton Goods

In our packing department we have six men who are operating two baling presses. A careful study of the work involved leads us to believe that the same amount of work should be done by not over four men. However, six men have been used for years. We are now planning a different method of handling the work so that the labor will be greatly reduced. At the same time we wish to establish a piece rate basis. Can you give me any suggestions for establishing a piece rate basis of pay? (4846)

It would seem that six men operating two baling presses in this mill are althogether too many. In a mill with 200,000 spindles and 5,000 looms they operate three baling presses, and have only three men, one to each press, and one extra man to

do the stenciling and sewing the burlap. All are paid by the day. Ninety-five per cent. of the bales are fully covered with burlap. The other five per cent. have burlap on each end. The three presses will take care of about 100 bales per day of 8¾ hours. The only case in which it requires longer to put up the bales is in the case of export goods, where they have to be covered with a material which keeps them moisture proof, and then covered with burlap on the outside. It requires about a half hour to put up one of these bales.

We do not believe that it is feasible to put press men on a piece rate basis unless you have an unlimited number of bales to be handled, as the theory of the piece rate is that the operator should not be held up waiting for work. A piece rate basis of pay might be considered from two standpoints; per thousand pounds or per cubic foot.

Bleaching Cotton and Wool Mixed Underwear

In connection with our underwear we manufacture several numbers of men's union suits; some are made of all wool, some with 75 per cent. wool, and others with 50 per cent. wool. We have been quite successful with washing and fulling the various mixtures, such as blue and silver mix, but have not been able to get satisfactory results in turning out a white, which we have not been able to accomplish by scouring and fulling. We wish to inquire whether you could give us some information as to how we will be able to bring this class of material out to a nice clean looking white.

For your information we are enclosing a small piece of material, which will give you an idea how it looks after scouring and fulling. You will note that it still has a grayish oily appearance. We wish to advise that we are only operating on a small scale on this underwear up to the present time; in fact, we have very little experience with the scouring and fulling of this underwear material, so any information you may be able to favor us with will be of great assistance to us.

(4842)

Wool when sheared from the sheep contains considerable dirt, perspiration, oil, grease, etc., and varies in color from a cream to a dirty brown. Even when this wool has been thoroughly scoured it retains a cream color. This cream cast can only be removed by bleaching. One of two methods is used; the sulphur bleach or the peroxide bleach. The sulphur bleach is carried out by hanging the extracted underwear,

after the fulling and scouring and rinsing, in an airtight chamber where it is exposed to the fumes of burning sulphur. To every 1,000 cubic feet of space burn about 5 pounds of sulphur. The goods are exposed over night, rinsed in cold water the next morning and dried.

The peroxide method is more complex but gives a permanent white and is less corrosive. The recipe usually used is as follows: To every 100 gallons of cold water add 5½ pounds sulphuric acid, 66 degrees Be., and 4 pounds of sodium peroxide with stirring. At this point make the liquor neutral by the addition of more acid or peroxide, whichever is required. Now add 2 pounds of silicate of soda and ½ pint of ammonia. Bleach for 4 to 5 hours at 125 degrees F.

The sample showing your scour and fulling appears to be well fulled, but could stand more scouring. In these operations do not allow the temperature to go above 130 degrees F.

Finishing Silk Knitted Fabric

We enclose three very small clippings of silk knitted fabrics and will be glad if you will advise us the method of finishing these and what special machines, if any, are necessary. We have in our plant the standard machinery used for finishing woolens; also for woolen jersey cloths, and would prefer of course to handle these fabrics with the machines we have, if it is at all possible. (4827)

Samples 1 and 2 of the finer knit fabrics are finished with a light calendering, drawing through the machine with as little tension as possible to get results and not strain the fabric. On the loop fabric we are in doubt whether the inquirer wishes to obtain a velvet face or to finish it with the rough surface as shown by the sample. If it is to be sheared for a velvet face we doubt if the loop is quite high enough to get good results. If it is just finished with a rough effect, the goods are simply steamed and then tentered or dried on cans so as to give them a smooth effect, with practically no finishing.

This loop fabric has also been finished with quite satisfactory results with an apron or backing cloth on a regular press; that is, the extra piece of cloth, or backing cloth, was put over the loop side of the fabric and the goods run through the press with a very slight pressure after being lightly steamed. We doubt if there are many of the machines used in the woolen industry that would be of any use for this fabric, outside of a cloth press, which might be employed to advantage, using an apron.

Gas Consumption in Finishing Plants

We are interested in learning something of the gas consumption in cloth finishing plants for singeing, drying, and calender roll heating. We presume that singeing is the biggest item. What we are interested in is some figure representative of the gas consumption per thousand yards or per million yards of cloth. (4847)

Gas consumption varies but a figure that may be considered representative is 100,000 cubic feet of gas per month for each million yards of cloth finished. We know of one plant where the gas consumption is 75,000 cubic feet per month per million yards of piece goods finished, and another plant where the gas consumption is 125,000 cubic feet of gas per month per million yards of cloth finished. In the first plant gas is used for singeing only, while in the second plant gas is used for both singeing and calendar roll heating. In both plants city gas is used.

From the above figures you can get an idea of the probable gas cost in a plant of any size by obtaining the output in millions of yards per month. You will be interested in the article entitled, "Producer Gas in the Textile Industry," which appeared in the May 5, 1923, issue of TEXTILE WORLD.

Finishing Crepe Goods

Enclosed you will find a piece of cloth. Can you give me some information on the finishing of this cloth; both wet and dry finishing? (4853)

The treatment which is advisable includes scouring, piece dyeing, drying and rolling up. There would be in addition a process of running the cloth through a pot-eye down into a water box with a roll in the bottom, then up over a creel or wooden roll, down into the box again, and up and down quite a good many times. Then the goods would pass out through another pot-eye leading down to a truck with a perforated bottom, then to a basket extractor, dried and rolled up. We are sending a rough sketch of this arrangement. Running the goods through the water in this way emphasizes the twist which is desirable in crepe goods. The water box and the wooden roll or creel over it would be perhaps eight to ten feet long. You would start the goods at one end and they would pass up and down several times around the roll overhead and around the roll in the water box until they reached the other end of the roll, when they would pass out through the pot-eye.

Twist in Tubing

I am sending you two pieces of tubing. One you will find is knitted straight, the other is not. Could you tell me the trouble with it? This tubing is used as it comes off the knitting machine in the finishing room without any further processing. (4822)

This question has been referred to the writer before and at that time one of the best machine builders in the country declared the trouble to be incurable. It has been our lot many times to knit yarns which had an excessive amount of twist for knitting purposes, and we have noted that with the greater number of turns of twist in the yarns we always had a greater twist in the finished fabric. From our experience we believe you will eliminate the trouble by the use of right hand twist in one feed and left hand twist in the other. Also proper conditioning of the yarn will help greatly.

Dyed Stockings Are Tender

We are sending you a pair of women's black hose. These are made of yarn composed of sulphur black cotton, shoddy and wool, spun on the woolen system. The black cotton is dyed with sulphur black, which is after-treated with solvolene. The knitted stocking is then cross-dyed with acid black with 3% of formic acid, then after-treated with 4% of bichromate of soda. We have had several cases of these goods returned on account of being tender. The goods that were returned as tender were made the same as described above except that the cotton was not after-treated with solvolene or the finished product with bichromate of soda. We would appreciate it if you could advise us if using bichromate of soda or solvolene makes the goods safe to put on the market. (4901)

Tests of these stockings show unmistakable traces of sulphuric acid, which is evidently the direct cause of their becoming tender. Sulphur blacks on cotton are known to suffer some form of decomposition in course of time, and to liberate sulphuric acid. This free acid is destructive to the cotton fibre, and should be neutralized. Where sulphur blacks are to be considered alone, this is a matter of no difficulty, since the cotton can be treated with a solution of acetate of ammonia. As the sulphur gradually decomposes, the acid that is set free is at once taken care of by the acetate, forming sulphate of ammonia and acetic acid, both of which are non-injurious to cotton. In the present case, we believe that the

traces of acid found in the stockings are due to omitting any precautionary treatment.

The cross-dyeing as above described does not appear to have any action on the tendering, since the dyeing was done with formic acid and bichromate of soda, unless there were traces of sulphuric acid in either of those chemicals; which a chemist could determine in a few minutes.

Since sulphur blacks decompose and weaken cotton slowly but persistently, it will be found best to after-treat the stockings with acetate of ammonia after they are delivered from the acid black bath. It should be remembered that this treatment only holds good as long as there is some acetate of ammonia on the goods. After they are once washed, the sulphur black will have free action to continue its injurious action. A better way to dye these stockings is to use a diazotized and developed black for the cotton, and then relieve your mind for all time about the goods being tender. Bichromate of soda is not in any way injurious, provided it is completely washed out afterward. Solvolene is safe.

Yellow Stains on Silk Stocking

To what would you attribute the yellow stains in the enclosed stocking? The stocking is knitted and dyed in the garment, the cotton being bleached and the silk dyed in the usual methyl violet bath. (4836)

The stain has somewhat the appearance of oil, and there is an unmistakable oily odor on the stocking. To determine whether it is caused by oil would require that the suspected portion be cut out and digested with ether. Not being permitted to cut up the sample stocking for testing we are unable to state definitely the cause of the stain.

Construction of Terry Towels

Will you please send me a terry towel construction? Can a man start a paying business on these goods with six or eight looms? (4862)

Terry or Turkish towels are made from yarns ranging 15s to 60s-2. The cheapest grades, sold in five and ten cent stores, are made from 15s to 20s waste yarns, while the better grades are sometimes made from 40s-2 to 60s-2 warp and filling. The warp should be purchased on beams ready for drawing-in, as it is not practicable to operate a slasher for such a small num-

ber of looms. One grade of towelling is about 22½ inches wide, 44 to 46 inches long, with 70 ends per inch, 35 pile and 35 ground ends, 54 picks per inch, 36s-2 warp and single 30s filling.

There are many factors which enter into the success or failure of the project contemplated. The following method could be adopted for securing business: Special goods could be made with special designs and borders for hotels, railroads and steamboat lines, submitting sketches of borders with names or special designs interwoven. This business will stand a good price for special work and the method suggested is a practical way for a small plant to do business. Jacquard looms would be necessary.

So many little unforeseen expenses enter into a business of this description that we would advise making a thorough investigation in getting prices of yarns, prices of sizing and beaming, trucking, cost of selling, etc. The filling would have to be of fairly good yarn, even in the cheaper grades of towels to withstand the strain of beating up picks which form the loops from the loose warp. The cost of the machinery and the amount of power required can be secured from the machinery builders who will cheerfully give the required information. The goods can be sent to finishers who make a specialty of this work.

Fire Hazards

Will you enumerate for us the importance of the different fire hazards in textile mills? (4857)

In listing the fire hazards in textile mills, particularly cotton mills, picker room fires must be given first place. Records show that from 52 to 62 per cent. of cotton mill fires occur in the picker room. These are caused either by foreign metallic substances or matches present in the cotton, or from the same kind of materials that get into the stock from the floor after the bales have been opened. Buttons, so called, from the ties of Egyptian cotton are particularly dangerous. These substances passing into the machine strike sparks when in contact with the beater blades and fire results. Fires in waste pickers are very common due to material swept up with the waste. Modern practice is to have the waste picker in a separate building, or at least in a separate room that is completely fireproof.

Storehouse fires in baled cotton, while they do occur, are not common. In a well-managed plant few persons have access to the storehouse, and there is no machinery or heat present as a rule. Fires in baled cotton on wharves or railroad platforms where there is unlimited access by the public are more frequent. It is admitted that when one does occur it is likely to be serious as fires in baled cotton are very difficult to extinguish.

Since the advent of the gas-filled electric lamp there have been a few fires, particularly in picker and card rooms, which have been caused by this type of lamp. Due to the better heat conduction inside the globe by reason of the gas the globe is considerably hotter than the well-known vacuum type. Dust or flyings collecting on the globe are liable to be ignited. A few mysterious fires that have occurred are now explained by the above.

A special hazard in connection with opening and picker rooms is the air-blast trunk conveyor or pipe system for conveying the cotton from one building or from one room to another. Once a fire has started these systems offer a means for rapid spread, and call for special protection.

Hot bearings are another hazard, particularly in gear boxes of roving frames and speeders, where there is generally an accumulation of oil, grease and fly.

The now obsolete (or at least it is rapidly becoming so) wood belt box or wood housing has been the cause of a number of serious mill fires. From some minor cause a belt would come in contact with the wood, friction would start a fire, and by way of the belt enclosures and beltholes in the floors the fire would quickly be communicated to other floors.

Steam-heating pipes, particularly when on the walls underneath the windows are a frequent cause of fires. Either the pipes come in contact with the floor or during the non-heating season combustible material is laid on or behind the pipes, the pipes are not properly cleared of this accumulation in the autumn before the steam is turned on, and a fire results.

Oil-soaked floors, while undesirable, cannot start a fire. Bad housekeeping also should not be tolerated, since both of these conditions offer excellent opportunity for the spread of a fire once it has started. Fire may originate in oily waste left around or in other combustible material that is left in the rooms over night.

Careless installation of electric wiring may cause fires as where there are untaped splices, bare wires, loose connections, etc. Wires in contact with machinery or attached to nails are dangerous. Lamp globes without wire guards in contact with wood or fabric have caused fires.

On the finishing end fires occur in the wood housings around tenter dryers generally due to contact of the heating pipes with the housing. Hot bearing in dryers are possible and have started fires. Inside napping machine housings there is usually an accumulation of dust and fly which is sometimes ignited by contact with a lamp globe. The remedy for this is of course to keep the enclosure clean.

Smoking is at all times an important hazard, the more so since the boys came back from overseas, and the cigarette has become so popular. Lighted pipes put in an employe's pocket have caused fires in mills.

Plumber's torches are sometimes overturned while repair work is being done; oil lanterns have been upset inside belt boxes and the oil and grease usually found in such places has been ignited with disastrous results. The open flame of any kind inside a mill is a bad hazard.

Holes in Bleached Cotton Goods

I am enclosing samples showing holes in goods that have been coming up in a new kier we have been trying out. We have been using this kier for about three months and the holes have been coming in varying amounts during this time; sometimes only a few, then again quite a number. We have tried everything that we can think of to remedy this fault but seem to make no progress. You will notice around the edges of some of the holes there are little black spots. I have noticed these around several of the holes but not all of them. Am unable to understand how they get there and wonder if in any way they can cause the holes. Would like very much your opinion concerning the cause of these holes. (4861)

We have examined the samples submitted but can see no evidence of tenderness around the holes, hence they probably are not caused by chemicals. The black spots are incidental, we believe. From the samples submitted the damage looks as if it is caused mechanically. It may be from causes such as a loose nail or screw in a reel, rough metal, etc. We would advise that the inquirer carefully check the route of the cloth through pot-eyes, over reels, through washers, etc.

Giving Cotton the Properties of Wool

We have been told that a process for giving cotton the properties of wool has recently been patented. Can you tell us how this is accomplished? (4876)

It is true that a process has been worked out and patented which is claimed to make cotton assume the properties of wool, but we cannot vouch for the results. In a description of the process which was recently printed it was stated that the properties of wool are bestowed on cotton when the products of a slow decomposition of protein substances caused by strong mineral acids are fixed on the fibre. The results may be obtained in various ways. Either the cotton may first be impregnated with the liquor of dissociation, the latter squeezed out and the mineral washed, or else the fabric may be dipped in the protein solutions, then treated with the hydrolyzing liquid, sqeezed out and washed. The exact order of the steps in the process does not affect the final results, it is stated.

The proteins that are used are casein, egg-albumen, serum albumen and gelatine. Various strong mineral acids such as 65 to 80 per cent. nitric acid, 55 to 65 per cent. sulphuric acid, 25 to 37 per cent. hydrochloric acid, etc., etc., are used in hydrolyzing agents, either alone or in admixture. Time of immersion and temperature are variable conditions which must be regulated according to the nature of the fibre treated, the particular protein used and the acid that effects hydrolization. Variation in temperature from 5 degrees C. below zero to 20 degrees C. above zero has no appreciable influence on the result obtained. The precipitation of the protein substance on the fibre is accomplished by merely washing the treated material in water. The process may be used on all vegetable fibres, either in the form of yarns or as fabrics, and it is also immaterial whether the fibre is mercerized or not, according to the inventor.

An example of how the process is actually carried out is given in the following: A slightly ammoniacal solution of casein is prepared, containing about 10 per cent of the protein. The fibre is dipped in this solution, dried and then exposed to the vapors of formaldehyde for some time. It is then treated for about two minutes with 75% nitric acid at the ordinary temperature, squeezed out or pressed out and washed. The yellow color of xantho-proteid which is developed by a secondary reaction may easily be removed by treatment with a weak carbonate of soda solution.

Cleaning Hosiery Machine Cylinders

On our 220 needle half hose machine, when cleaning same we find that after the cylinder has been cleaned and new needles installed, when we replace a cylinder the needles function freely enough but the cylinder lags and turns hard. We also find this at times when we clean only the sinker ring. For your information we used a little gasoline when cleaning cylinders and wonder if this could be the cause. If so would you suggest a better cleaner or advise some way that this difficulty might be overcome. (4884)

If your cylinders are thoroughly cleaned, wiped dry and oiled well, we do not think you should have any trouble from the use of gasoline as a cleaner. We have made a practice of cleaning our bright machine parts with hot caustic soda, following the soda bath with very hot water or steam, and wiping dry. This is an easy way to clean machine parts. We believe it is advisable to oil parts well as soon after cleaning as possible, because if all the oil has been removed by cleaning they are liable to be corroded from contact with the operative's hands.

Weaving Tape with Holes at Intervals

Can you enlighten me as to where I can procure tape with a hole woven at regular intervals as per enclosed sample? I formerly wove this tape myself but would like it done elsewhere. Can this hole be effected by a single shuttle batten? (4866)

A special loom is built by the Crompton & Knowles Loom Works, Worcester, Mass., for weaving goods of this character. In general principle it is a single shuttle loom having an auxiliary bank of shuttles which run continuously and in unison with the regular shuttle and underneath the regular bank. They only engage with the weaving shed at the time the hole is being woven. This is accomplished by the use of a double set of harness, one set being used for either side of the hole in the tape, and these harness being operated by specially designed "twin" cam jacks. Each particular cam used in the weave is connected to these special cam jacks, which are made to operate two distinct sheds when desired, one opening up above the other. This allows the regular shuttle to engage with the upper shed and weaves the cloth at one side of the

hole, while the auxiliary shuttle engages with the lower shed and weaves the cloth at the other side of the hole.

This movement is effected by a reverse slot arrangement in the special cam jack which, when operated by a lever attachment, is made to produce two distinct sheds for the weaving of that part of the tape which has the hole in it. This change in the operation of the cam jack can be called on at will and provisions are made so as to be able to regulate the length of plain tape required, and also the length and position of the holes.

When making the plain part of the tape, both sections of this cam jack operate in unison as if in one piece, but when the hole is "called on" a device for spreading each pair of cam jacks being used in the weave is operated and the two sheds are then formed, facilities being provided for governing the length of the plain part of the tape and also the position and size of hole required. The lay is also raised and dropped by the same general movement so that it may run in a new position when the two sheds are formed and both upper and lower banks properly engage the sheds.

By this method of weaving goods of this character the filling or weft of the lower bank of shuttles is not woven or bound into the goods at the parts between the different holes, but lies dead, floating underneath. Should this feature be objectionable in the use of the goods in manufacturing, the loose thread may be bound, or woven into the cloth, by using an additional harness for the operation of one of the warp threads lying next to the hole in the tape. An extended movement is given to this particular harness by attaching an extension to the harness jack which operates it so that the warp thread which drops below the goods will engage the lower shuttle thread, thus binding the floating thread into the goods at every alternate pick of the loom. These looms are calculated to be run at a high rate of speed, reducing the cost of weaving to the lowest possible point.

Scouring Wool Gloves

We are manufacturers of knitted gloves made from combinations of wool, merino, etc., and find that our greatest trouble is in fulling our goods successfully. If there is any information we can get to improve the finish of our product it will be of great value to us. At the present time we are using a palm olive curd soap and scouring our goods with

alkali. Our greatest trouble seems to be in the fact that we are unable to scour them without first putting them through a solution for about an hour and 15 minutes. This seems to take all the life out of the goods. We believe that if we could learn of something that would scour these goods more quickly without stripping the colors we would overcome a great deal of our trouble. (4867)

The goods would have to be extremely dirty and greasy to make it necessary to scour them for one hour and 15 minutes. You fail to mention the strength of your scouring or fulling liquor and also the temperature you maintain while scouring. The writer is assuming that when you mention scouring with alkali you mean the chemical known as caustic soda. Caustic soda causes many colors to bleed or strip, and also causes the wool fibre to weaken.

From the writer's experience the following formula should give good results on knitted gloves if the soap used is fairly neutral and the gloves are not extremely greasy. For 100 pounds of goods

Palm olive curd soap	8 to 10 lbs.
Soda ash or Wyandotte Soda	2 to 4 lbs.
Ammonia	¼ to ½ lb.
Temperature	110 to 130 degrees F.

Run for 30 to 45 minutes and wash well with lukewarm water.

Number of Workers on Drawing Frames

How many deliveries on drawing frames does one worker tend in an English cotton mill? (4872)

Twenty to 24 deliveries are generally taken care of by one tender on medium work; 24 to 32 deliveries on fine work.

Carbonizing Vegetable Matter in Wool

We are having some trouble in carbonizing noils and a low grade foreign wool with sulphuric acid. Please advise me what strength the acid solution should be, and the length of time the wool and noils should remain in the solution. What temperature is used in drying? (4859)

In carbonizing with sulphuric acid the proper strength of the solution is determined by the character of the vegetable matter to be destroyed. It varies from 3½ degrees Be. to 7 degrees Be. Unquestionably the best practice is to use the

lowest percentage of acid that will properly penetrate the densest burrs. The length of treatment has little to do with the process, the sole object being to saturate completely the vegetable matter with acid. Nothing is to be gained by immersion for a longer time, as no further action will take place on vegetable matter when once saturated, and the possibility of damage to the wool fibre is incurred.

Drying is done at 160 degrees F., and the wool should, of course, be kept as open as possible. The carbonizing operation proper takes place only after the wool is dried, and is accomplished in about 20 minutes at a temperature of around 220 degrees F.

An excellent article entitled "Carbonizing Raw Stock and Piece Goods" was printed in the June 11 and June 25, 1921, issues of TEXTILE WORLD, and it would be worth your while looking up these articles.

Cloth for Vacuum Cleaner Dust Bags

I should like very much to have whatever general information you may be able to give us with respect to the material or materials used for making the dust bags for vacuum cleaners? I understand that cotton fabrics are used for this purpose, and that they are subjected to some sort of chemical treatment of which the purpose is to cause them to retain the dust while permitting the passage of the current of air from the suction fan. More specifically, what I should like to know is: (1) The approximate construction of the original cotton fabrics; (2) just what is the "chemical treatment" to which the cloth is subjected. (4865)

We believe that cotton fabrics such as moleskins, heavy warp sateens and twills are used for vacuum cleaner dust bags, but do not understand that there are any specific constructions employed. Various qualities of goods are used. Some of the cloths are napped and this would seem to present difficulties to the passage of dust. On some goods chemical treatment is given to make the cloth employed for bags fire-resisting, and possibly to make the material more or less dust-proof, but this treatment is considered a secret process, and we have no direct knowledge of the particulars.

As a matter of fact, some of the vacuum cleaner people buy their own goods direct from cotton mills or otherwise buy them dyed from converters and afterwards treat them over a padding machine and cylinder dryer to give whatever special

treatment is employed. Some of the vacuum cleaner concerns operate 2-roll mangles or padders and cylinder dryers for treating their own goods. The cloths generally used are 54 inches wide.

Temperature in Steaming

In the finishing of cotton goods is control of temperature in steaming or ageing of enough importance to warrant the use of regulators? (4875)

Steaming or ageing should be controlled by temperature regulators, as the various types of steamers and agers are worked at anywhere from 160 to 212 degrees F., depending upon the requirements. More or less heat than a stated degree may have serious effects on certain lines of colors.

Curved Braided Elastic Web

We are braiding an elastic web and have been doing quite a little experimenting, but so far we have not been successful in getting a straight braid. It is curved as per sample herewith enclosed. If there is any way that you know that we could overcome this trouble, kindly advise. (4886)

The unevenness of the sample of braid submitted does not appear to be due either to faulty construction or method of braiding. It arises entirely from the irregularity of the individual threads which go to make up the rubber warp. Dissection of the piece received shows a difference of at least 8% in the length of some of the threads, doubtless caused by poor rubber warping, although the same condition might arise from irregular feeding of the individual rubber threads into the machine when braiding, caused by undue friction at the different parts of contact when passing through the machine bed. If it is so caused, however, the fault may be corrected by using small grooved case hardened steel rolls, over which the different rubber threads are passed, thus allowing for perfect freedom of movement before they reach the fabric. This method will also minimize to a great extent any risk of chafing of the threads and allow for greater economy of rubber. At the same time it will produce a better fabric.

But poor rubber warping is undoubtedly the trouble. While it is of primary importance in the manufacture of all elastic fabrics that great care be at all times exercised in the making of rubber warps, it is essentially so in braids, where absolutely nothing can be done to correct any irregularity creeping in

from this cause. In weaving it is sometimes possible to manipulate cotton warp threads or fix a front reed so as to correct a certain degree of unevenness of fabric resulting from irregular rubber warping. But this cannot be done in braids where the stretch required is often much more than is desired in a woven fabric. It should at all times be remembered that these individual warp threads act as a series of springs, each exercising a certain power of contraction at the particular part of the fabric it controls.

Poor rubber warping is often caused in the splitting of the chain warp into small sections and by not using sufficient length of floor space to allow for a proper distribution of any irregularity which may arise through the opening up of the chain. Or it may be caused by poor beaming, and improper handling of the reed at the beam. The cause should be determined and corrected, as perfect rubber warps are the first essential of perfect goods.

Babbitt Lining for Hanger Bearings

Is a babbitt lining of ⅛ inch sufficient for hanger boxes? (4897)

While a lining of less than ⅛ inch thickness is used in many boxes without giving trouble, a thicker lining is an advantage. Where these thin linings are scorched once they have to be renewed. Where the lining is thicker, say 3/16 of an inch or more, when the box becomes hot it can be scraped and used again if not too badly scorched. It should be remembered that hanger boxes give service according to the attention that is given to oiling. Some boxes will last for years with a very thin lining, while renewals on others would be required annually, or more often unless frequently and systematically oiled.

Weaving and Bleaching Cotton Gauze

Will you kindly give me some information in regard to weaving and bleaching of the enclosed sample? Cloth is to be made about 34 or 35 inches wide. (4890)

The fabric counts 20 x 16, and is made from 30s warp and 35s filling. There would be no difficulty in weaving it on any type of loom. The only trouble that could occur at the loom is the tendency of the picks to slip and this would be caused by any rough surface that the cloth might pass over on its

passage to the cloth roll. It has been found practical in order to prevent the distortion of the picks to place zinc or tin on all surfaces over which the cloth has to pass in moving down to the cloth roll. These surfaces should be as smooth as glass. The greatest trouble will come after the cloth leaves the loom, but many mills that are now making this cloth do not let it go to the cloth room at all, but send the roll just as it leaves the loom to the bleachery. This cloth is rarely, if ever, inspected.

The bleaching of cotton gauze like the sample is accomplished in a simple manner. This is mainly due to the fact that the goods are of such light construction that they will not stand pulling or processing on the regular bleach house washers and squeezers. Well known eastern plants specializing on gauzes of this type take the cuts from the gray bale, throw out the ends for a yard or two, and place the cuts in this manner, without being sewed, directly into the kier, laying them evenly for proper boiling. They are well washed in the kier and afterward taken to the bleaching cisterns, where the chemical or bleaching liquor is circulated by pumps and the goods washed in the same manner.

The pieces are then laid on flat trucks, sewed, and taken to the tenter range, which usually consists of small squeezing mangle, six or eight drying cylinders, 60 to 90-foot tenter, with the proper heating and ventilating system arranged to blow air on to the cloth as it passes over the tenter. At the end of the tenter there is arranged an automatic double drum winder for winding up the goods. In this condition they are then sent either to the bandage cutting machinery or yarding off machinery and put up ready for sterilizing.

Manufacturing Cost of Sheeting

Can you furnish us with the manufacturers cost of 64-68, 3½ sheeting? If possible give the cost of the yarn, cost of the weaving, etc., and commission where it is handled through agents. This to be based on current prices, if possible. (4823)

In the manufacture of 36-inch, 64-68, 3½-yard sheeting, we should probably use 22s carded warp yarn and 25s carded filling yarn, making these yarns of a 4.00 hank fine frame roving.

The cost figures given below are felt to be typical of the average New England textile plant operating on a 48-hour schedule, and are based on the present wage scale, which in-

cludes the 12½% increase granted in 1923. All of the figures include a typical allowance for items of overhead expense such as supplies, salaries, fuel, taxes, depreciation, etc.:

	Per lb.
Cost of warp yarn through warping	$.0553
Cost of filling yarns through spinning	$.0475
Cost of slashing and drawing-in	.0074
Weaving piece work	.0550
Weaving general expense	.0321
Cloth room cost	.0040
Total manufacturing cost	$.2013

To the manufacturing cost per pound must be added the cost for cotton in cloth. This is obtained by determining the percentage of net waste, which should not exceed 16%. This waste percentage should be deducted from 100% and the cost of cotton in the bale divided by the figure thus obtained. The result will be the cost of cotton per pound of cloth. On this basis cotton which costs 28 cents per pound in the bale would cost $0.3332 in cloth. The manufacturing cost has been previously determined to be $0.2013 per pound of cloth and the cotton cost is $0.0332 per pound of cloth, thus the total cost per pound including cotton is $0.2013 plus $0.3332, or $0.5345. The cost per yard is obtained by dividing the cost per pound by the cloth weight, which in this case is 3½ yards per pound, hence, $0.5345 divided by 3.50 yards equals $0.1527, total cost per yard.

As the commission depends entirely on the selling price of the goods and the manner in which the goods are handled; that is, whether they are sold through commission houses, selling agents, brokers, etc., it is practically impossible to include this item in the cost figures. In New England the customary brokerage charge on cotton goods usually amounts to about one-half of one per cent. of the selling price of narrow plain goods, and one per cent. of the selling price of medium and wide plain goods and fancy weaves.

Chinchilla Finish

We would appreciate it if you could tell us how to make material similar to enclosed sample appear like a chinchilla. Could you recommend a method or some machine that would do the work? (4885)

Run the pieces of cloth in the damp state through a napping machine or over a teasel gig until a sufficient length of nap

s raised on the face to have the chinchilla effect developed by a chinchilla machine. Probably this can be accomplished n two or three runs through the machine.

Drop Stitches in Mercerized Hosiery

Will you please tell us if anything can be done to mercerized cotton in the process of knitting or finishing to stop drop stitches from running. We are purchasing our mercerzed yarns in the natural shade. We would appreciate any nformation regarding bleaching same as to retain the luster. (4889)

Since flexibility and elasticity are such valuable characteristics of high grade hosiery it is doubtful if it would be wise to try to treat the mercerized yarn either in knitting or finishing. Any treatment which would hold the stitches would make the fabric of poor texture. A drop stitch in itself is undesirable, but the quality which makes the drop stitch run seems to be of great value. In the manufacture of silk hosiery we find this tendency much more pronounced than in mercerized. We believe if you are to manufacture bleached hosiery and can afford to take the pains necessary to keep the work clean you can make a better article from bleached yarn. Bleached yarn will not run as easily from a drop stitch as an unbleached yarn.

For the bleaching of mercerized yarns which are in natural shades, the writer would recommend the use of only soda ash and a small percentage of not more than ½ of 1 per cent. soluble oil of straight castor oil basis, for the boiling charge; also soda ash at about 2 per cent. by weight of the actual amount of yarns to be bleached. After boiling it would be well also to take care that no acid liquor was used to neutralize the alkaline effect on the goods. This should all be accomplished by extremely good washing in hot water. There are several well known assistants to the improvement or retaining of luster on mercerized yarns which can be used in the final wash, one of the best known being ammonium stearate.

Belt Transmission Rule

Can you give me a simple rule to indicate the amount of power transmitted by belts of different sizes? (4868)

A simple belt transmission rule is as follows: "A single belt running one foot per minute will safely transmit one

watt of electrical energy per inch of width of belt." Thus, if a single leather belt one inch wide runs 5,000 feet per minute it will transmit 5,000 watts. If the belt is 10 inches wide it will transmit 50,000 watts at the same speed of 5,000 feet per minute; 5,000 watts is equal to 5 kilowatts; 50,000 watts is equal to 50 kilowatts.

Should it be desired to convert the watts into horsepower, multiply the number of kilowatts by 1.34; or multiply the number of watts by .00134. Thus:

5 kw. x 1.34 = 6.7 H.P., or

5,000 watts x .00134 = 6.7 H.P.

The above also applies to woven cotton belting of the same thickness as leather belting. For light double leather belts add 25 per cent. For heavy double leather belts add 60 per cent.

Mildewed Goods

We have received several pieces of worsted cloth from manufacturers in a damp condition. The excessive heat has caused mildew to develop while the cloth was in transit to us. We have not processed any of these mildewed pieces, which are to be scoured and dyed. Can you suggest any process to counteract the mildew which has developed? How about formaldehyde? (4880)

If it is actually mildew that has developed in the goods, it is doubtful if any chemical treatment will do more than to arrest or prevent the further extension of the injury. Whatever damage has already been inflicted upon the goods will remain as a permanent injury. To prepare these goods for whatever processing they are to be subjected to, first wash them in clean water and then pass them through a warm formaldehyde bath. This is assuming that mildew is actually present.

If the goods have been weakened by means of the combined action of warm water and continued heat, the weakening is probably due to bacterial action, for which there appears to be no known remedy. A condition very similar to this was noted in TEXTILE WORLD over a year ago, and reprinted in Kink Book, Vol. V, pages 128 to 130. The case therein cited seems to cover the condition referred to in the above inquiry. True mildew, such as is common on cotton, is not frequently identified on wool, and it would be interesting in the present instance for the above correspondent to send us a small sample of the worsted cloth suspected of

being affected with mildew. We could then make a thorough microscopical examination and form a more satisfactory explanation.

Weaves for Six and Eight Harnesses

I enclose samples of cloth made of 2-20s yarn. I want to get out some fabrics of the same general appearance and construction but different in weave; something new if possible. We can only make up to six harness weaves, that is, eight harnesses including selvages. Will you help me out by suggesting possible weaves? (4749)

There is little choice in the weaves of the character required that can be made on six harnesses, but we illustrate at Fig. 1 a few that are even sided; that is, the number of

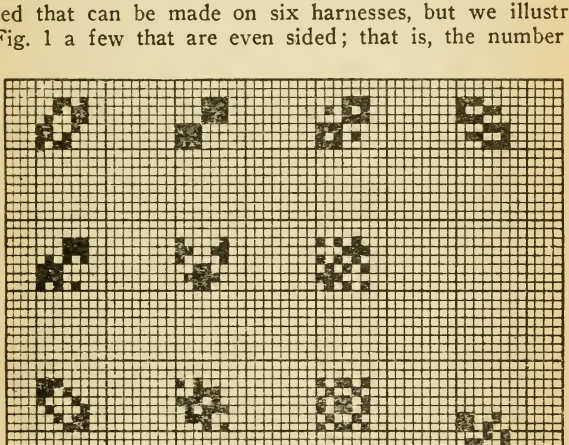


Fig. 1.—(Above) Weaves Complete on Six Harnesses, Allowing Two of the Eight Harnesses to Be Used for Weaving Salvages.

harnesses that are up equalling the number that are down. There is more scope in the eight harness weave as shown at Fig. 2. These can easily be woven on an eight harness dobby if the selvages are hooked up to the rocker arms of the

dobby—a very common practice on all dobbies, and particularly where the number of harness levers is small. It is a very easy matter to hook up the selvage harness on the rocker arms, but the weave for the selvage will be plain in all cases. Another method is to use a selvage motion such as is used on cam looms when weaving sateens and twills, but the writer

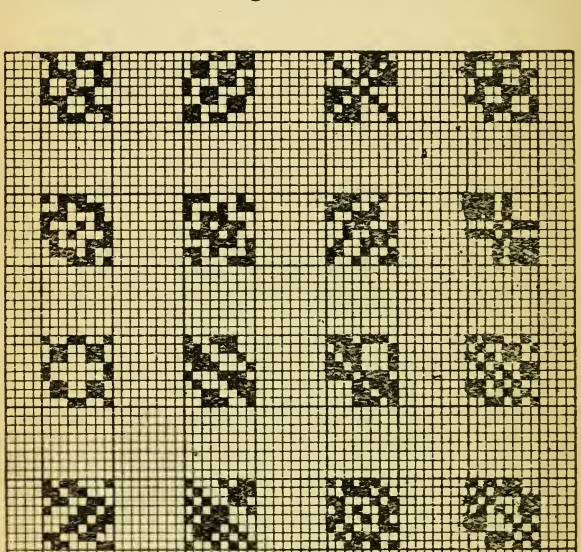


Fig. 2.—(At Right) Eight Harness Weaves; Can Be Woven on Eight-Harness Dobby if Salvage Harnesses are Hooked Up to Rocker Arms.

would prefer the method of hooking up to the rocker arms, and this leaves eight harnesses available for the pattern. The inquirer would find such a book as "Handbook of Weaves" by Oelsner very helpful. It can be obtained from TEXTILE WORLD'S Book Department.

Arrangement of Loopers

We have about 20 loopers and it is necessary for us to construct new tables for same. The tables we have been using, in our opinion, are too wide, and what we want to know is what is the best width to make looper tables. We would also like to know how high above the floor the points should be for the average looper. Also if loopers are placed so that the operative sits with her back toward window next to wall, how far should looper be from the wall. We would appreciate any information which your experience will enable you to furnish us in accordance with above. It has been suggested to us that a good way to handle the looping is to furnish the looper with unlooped work in baskets, and after she loops same for her to drop the dozens over the table into box or basket directly in front of her looper. Do you consider this a desirable arrangement? (4892)

The following reply is from one of the largest hosiery mills in the country: In our own mills we are using a cast iron individual stand, the height of this stand being approximately 36 inches. The stand in question consists of a hollow cast iron pedestal about 4 inches in diameter at the base and about 2½ inches in diameter at the top, having a flat base about 18 inches in diameter and a flat top about 6 inches square where the looper is attached. These stands are placed 36 inches apart from center to center, with the result that the loopers are also 36 inches apart from center to center, or about 20 inches apart between the inside points.

These stands are also located with a driving shaft running through the center, thus permitting our operating the machines from each side of the shaft, the distance between the two rows of loopers which are running off one center shaft being also exactly 36 inches. We find that an installation of this kind enables the machine adjuster to get in behind the machines readily to make the necessary adjustment. In addition to this, we find that it also gives us plenty of room and working space, and also good ventilation.

We supply each operator with two fibre cans, approximately 24 inches in height and 22 inches in diameter. One of these cans is used for the unfinished work and one for the finished work. Our present units consist of 16 loopers to each line of shaft, 8 loopers on each side, each individual unit being operated by an individual motor drive. We have found it advisable to line up our machines crosswise rather

than lengthwise of the room, as we find we get much better results by having the light come in from the side rather than from the front or the back of the operator, the machine nearest the window being located approximately 36 inches from the wall.

As you mention constructing your own tables, these tables should be approximately 40 inches in height and 36 inches in width, arranged with a center shaft so that the looping machines may be placed on each side of the table and driven from the center shaft. The looping machines should be spaced approximately 36 inches apart and the points of the looper should be about 40 inches from the floor for the average looper.

We have found it advisable to have all machines set exactly the same distance from the floor and we use adjustable chairs so that the operator can easily adjust the chair so as to give her the most comfortable position possible.

Calculating Number of Ends on Beam

How can I calculate the number of ends on a beam if the weight of yarn, length of yarn and counts are known? For example, a beam contains 40 pounds of 20s cotton yarn and the length of the warp is 1,500 yards. How many ends are on the beam? (4878)

Multiply the weight in pounds by the counts and by the standard number (840 for cotton) and divide the product by the length on the beam. The answer is the number of ends.

$$\frac{40 \times 20 \times 840}{1{,}500} = 448 \text{ ends.}$$

The above is the calculation that may be employed, but it would probably be better to make an actual count of the number of ends.

Speckers on Piece Work

Is it practical to have speckers on piece work? I have reference to woolen goods specked previous to pressing. Do many mills have the piece work system? How do they pay? Are there any important details that should be observed to make the piece work system a success? (4895)

It is hardly practicable to pay speckers by the piece work system because there would be incentive to slight the work,

which demands careful attention in respect to cleanly picking out specks without creating tiny holes in the cloth. We know of no mills where piece work for specking has been adopted. A common practice is for the overseer to take note of the number of pieces specked each day, either by a single specker or two speckers working in combination. The pattern and number of these pieces are also noted. In this way inefficient speckers can be detected and disciplined. Distinct pieces of cloth may, of course, vary much in speckiness, which is also against the employment of the piece work system.

We submitted the question to two finishers on different types of goods and their comments are given below.

The first finisher replies as follows: My experience has been that it is quite impossible to establish a rate that would prove practical for speckers on piece work, and I have never known of any mills that have paid their speckers by the piece work system. While it is quite common to have burlers on piece work, it would be more difficult to establish a rate that would prove economical and equitable for specking.

There is not much variation in the work of burling, except such as is due to a difference in the kind or quality of the goods, and a rate can be made to correspond. But in specking it is often the case that goods of the same kind and quality, even in the same line, require such a difference in the time to handle them properly that it would be quite impossible to establish a rate that would be satisfactory to all concerned. As an example: the writer is now working upon a line of goods which require a variation of time ranging from 30 minutes to ten hours.

Styles made from certain mixtures composed of dark colors and white have many specks, largely due to a short, nubby stock that is difficult thoroughly to card out, while in some solid colors this defect is hardly noticeable. There are also some dark colors, such as blue, brown and green that require much time on account of particles of burrs that do not take the full color in dyeing, and must be removed or covered in specking. In some light shades such as buffs, "sand colors" and the like, the smaller of these specks are not noticeable.

So it will be seen that the color or character of the mixture has much to do with the amount of specking necessary and it would be difficult to establish a rate for piece work that would properly meet such a variety of conditions. If the goods were all of the same kind, with slight variations

in shade, the piece work system might be made to work, but as already said, I have never known it to be done.

The second finisher sends the following: Specking varies so much, especially in woolens, that I would say it is not practical to have the speckers on piece work. At present we pay the speckers $16 a week, 48 hours. As a suggestion I offer the following because I see it is a question of production that is wanted. Take the work of your best speckers as a standard and pay say $16 a week for it. Then pay 15 or 20 cents to each specker for every piece over the stated number. This should hustle the work along if anything will.

Stains on Dyed Pieces

We are engaged in the dyeing of worsted with silk effects, using the chrome top process. During the last few weeks we have had cases of yellow streaks or stains on the brown pieces. The length of these stains varies from six inches to a yard. The stains are on every piece in the kettle but are only found on one place on a piece. This condition seems to prevail in all of the kettles in which we dye brown pieces. Will you please give us a few suggestions as to what might be the cause of this trouble and what can be done to remedy it? (4898)

Without seeing the goods that are referred to in the above inquiry we venture the suggestion that the source of trouble be sought in the scouring of the pieces. It may be possible that the trouble is the direct result of oil streaks on the cloth that do not become apparent until the cloth has been dyed. Neither the dyeing process nor the top-chroming is likely to have anything to do with the streaks or stains. From the statement that the streaks are found only in one place on the piece, it might be well to make a thorough inspection of the several machines that the pieces pass through for the purpose of locating any defects in their operation.

Do the pieces pass over rollers of any kind? Sometimes the causes of spots, streaks and stains are found to lurk in rollers that are not readily cleaned out. While the stains or streaks appear to show on the brown pieces it may be possible that they are also on other pieces, but not so readily discernible. Spots appear to show more plainly on browns than on other colors.

Of course, there is a possibility that the streaks are due to undissolved particles of dye floating around in the dyebath,

which becoming attached to the goods continue to dissolve where they lodge and thus cause streaks. Cases of this kind are common. Reading of the recently published article on dissolving dyestuffs in the May 26, 1923, issue of TEXTILE WORLD may give some pointers that will clear up the trouble.

Capacities of Tanks

Will you give me the rule for finding the capacity in gallons of a round soap tank and a square one? (4893)

To find the capacity in gallons of a round tank, multiply the square of the diameter in feet by 0.7854 and multiply the product by the depth of liquor in feet. This result gives the capacity of the tank in cubic feet. Multiplying this by 7.5 (the gallons per cubic foot) gives the capacity of the tank in gallons.

For example: What is the capacity in gallons of a round tank 10 feet in diameter and 10 feet deep?

10 x 10=100
100 x 0.7854=78.54 sq. ft.
78.54 x 10=785.4 cu. ft.
785.4 x 7.5=5890.5 gallons.

To find the capacity of a square or rectangular tank, multiply the length in feet by the width in feet and then multiply the product by the depth in feet. This gives the capacity of the tank in cubic feet. Multiplying this by 7.5 gives the capacity in gallons.

Spray Printing

I want an ink for printing on worsted. It must be produced in a variety of colors of which black is of the least importance. It would not be printed on as it is usually done on silks and cottons but put on with an air-brush. In other words I wish something in the way of a dye or ink to make "hand" painted worsted garments. Owing to the fact that the garments are to be decorated after being made up it prohibits any after-processing such as washing or boiling, though it might be practical, although inconvenient, to put them through a steaming process. (4910)

Printing by means of the air-brush takes two general forms: The first is where one or more stencils are used (one for each color) by means of which many beautiful designs are worked out. The other is where the jet of color from the air-brush simply forms a colored patch or area on the goods being printed. The fixation of the sprayed colors

is rarely attempted, it being sufficient for the colored solution to dry on the fabric. The difficulty in fixing the colors is on account of the absence of any thickening agent to prevent the colors running.

Spray or air-brush printing is sometimes done with solutions of dye dissolved in alcohol. The dyes used for this particular alcoholic solution are known as cerasine or wax colors, and are insoluble in water. Another group of colors —the ordinary acid dyes—are used in a water solution, which is made up by dissolving about 4 ounces of the acid dye in one gallon of water, and adding from ¼ to 1 ounce of tartaric acid. These dyes may be lightly steamed if the goods printed are of silk or worsted.

Basic dyes are also much used, this solution consisting of 5 parts of dyestuff in a mixture of 150 parts acetic acid, 10 parts acetin, and 805 parts water. This is heated until solution is complete; 30 parts are added of a mixture of equal parts acetic acid and tannic acid. Strain or filter before transferring to the air-brush. Goods that have been sprayed-printed with basic dyes may be lightly steamed to fix the color.

Spray printing is almost a neglected art, and textile designers seem to have overlooked its possibilities as a means of producing effects not likely to be secured by other methods of color application. For certain weird effects on hosiery that rival the now overworked tied-and-dyed process, it is without equal.

Coated Gauze

I am enclosing a sample of material of which I would like to know the correct name, and also the method of manufacturing. (4870)

The material is a very sleazy woven cloth fabric with about 20 warp and 16 filling threads per inch, which has been coated with a transparent substance that fills the interstices of the yarns. We have never heard a name given the material. Probably it would be given different names by different sellers, according to the uses to which it was put. Without analyzing the coated gauze in a chemical way, it would appear to the writer that a considerable part of the coating consists of either gelatine or natural colored ground glue with the addition of flake tapioca properly cooked and combined with the glue.

From the writer's experience with buckrams and such fabrics, he would say that the only way to obtain this finish would be on a special coating machine where the "dope" was held in a receptacle immediately above the carrying roll and the sizing material or coating material pushed into the mesh by means of a very fine doctor blade. This coating is very thin and also very sensitive to moisture, and it could not be applied by the use of a starch mangle. There are only a few concerns in this country who are able to produce such a treated fabric and you may rest assured that they keep their actual process somewhat under cover. Any concern going into this business would have to do considerable experimental work.

Loop Edge Tape

There is enclosed herewith a sample of loop edge tape generally used for wrapping tubes (for automobile tires) during the process of manufacturing. The construction is as follows: 198 warp ends of 26/2 ply yarns and approximately 36 picks of 26/2 ply yarn. The tape is 2¾ inches wide exclusive of the loop, and weighs 4.4 pounds per gross of tape. Assuming that the plied yarn could be purchased at 47 cents per pound on tubes, we would like to know the cost of production of the tape including all necessary expenses. (4909)

A fabric of this character should be made on a loom of about 20 spaces and run at a speed of from 110 to 120 picks per minute. Allowing for stoppages estimated at 20 per cent. a loom would produce approximately 30 gross yards per week of 48 hours. A weaving cost of 60 cents per gross would permit a weaver to earn about $18 per week. This estimate would vary of course according to local conditions; but it affords a basis for costing. Warping should cost about 1½ cents per pound, or about 7 cents per gross. Based on these estimates the cost would be about as follows:

4.4 pounds 26/2 at 47c	=$2.07
Weaving per gross	= .60
Warping	= .07
	$2.74

This does not include putting up expenses, which vary according to lengths required and method of putting up desired. Should these goods be required in large quantities, sufficient to operate looms in pairs, the item for weaving might be cut down considerably.

Use of Babbitt for Patterns

We have heard that babbitt metal is sometimes used for patterns in casting parts of machines. Is this correct and how it is done? (4896)

Babbitt metal is occasionally used for casting patterns of machine parts where castings are to be made from a broken part or where castings are wanted in a hurry and no pattern is available. In this case the first mold is poured with babbitt. The babbitt shrinks very little compared with cast iron. Where any part of the casting is to be finished, metal can be put on to the babbitt pattern. This is a very handy use of babbitt metal in emergency work as it saves making patterns and the babbitt can be melted and used over again for other purposes.

Holes in Dyed Artificial Silk Fabric

We are having some difficulty in dyeing knitted artificial silk fabrics like samples when dyeing them after they have been lying for about four to six weeks. The undyed sample is a piece of the cloth after it comes off the machine. In the manufacture of this cloth we use a fair quantity of neatsfoot oil. All merchandise is carefully mended so that same goes to the dyers without any imperfections, either holes or drop stitches. The cloth after dyeing has a great many holes such as are shown by the colored sample. These holes appear throughout the piece, making the cloth unsalable in a regular way. We would appreciate your information as regards the cause of these defects. (4879)

The holes found in this fabric are difficult to trace from the information given, although, in view of the fact that the fabric is delivered to the dyers without any imperfections, it is fair to presume that the damage is done while in the dye-house, or during the process of dyeing. Artificial silk does not possess the same strength as natural silk, and more particularly when it is wet. It is therefore reasonable to believe that some or all of the holes or other perforations were made while the goods were either in the dyebath or dyehouse. Possibly the holes were made while the goods were going through the dryer. It is suggested that a thorough examination of all mechanical conditions be made during and after dyeing. No doubt the dyer will co-operate in this inspection, since it is to his advantage to make delivery of as perfect goods as possible. One hole in the sample of cloth submitted seems to

have all appearances of having been cut with something sharp; the other holes seem to have originated by a thread breaking and then being worked into a hole by gradual tension. The presence of neatsfoot oil on the artificial silk does not appear to have contributed anything toward weakening of the fibres. We attribute the holes to threads breaking while the fabric has been in a wet or moist condition and under tension of its own weight, or to a roughened surface of the dyebath.

Pink Stains on Towels

We are mailing you under separate cover a sample pair of towels with a pinkish discoloration. As near as we can tell these towels were not discolored in coming in contact with any other pink or red material, but the stain was caused by some chemical reaction when they were exposed to the light. We would greatly appreciate it if you would have your research department make a test of this towel and favor us with the result of their findings. (4914)

A test of the towels shows that they contain a trace of sulphuric acid at the portion that is distinctly pink, while the reaction of the white portion is practically neutral. It is a curious condition that this pink coloration follows a line of fold of the towels, and one would think that this fold was exposed to the action of the air, and that the air might have been contaminated with the fumes of some volatile hydrocarbon. These fumes coming in contact with the exposed portion of the fabrics that contain the traces of acid, suffered some chemical decomposition which produced a reddish compound, and thus the pink color appears.

The general belief is that pink colorations are likely to appear on cotton textiles when the washing after the sours has not been complete; that is, the washings after the sours following the bleach. Some practical bleachers believe that a pink coloration may result from the imperfectly washed cloth being allowed to lie too long a time in contact with water or acid-soaked boards in the bleach works, such contact causing the goods to soak up some of the dissolved constitutents of the wood. This is a possible cause of some discolorations, but in the present case the line of the pink color is so straight and comparatively even with the edge of the towels that the only theory as to its formation is that of exposure to the air, and that the air was contaminated with fumes of some kind.

Light alone will not cause a pink coloration on pure, clean cotton. This has been demonstrated by a large number of experiments carried on for the purpose of reaching a definite conclusion in just such cases as the present one.

In TEXTILE WORLD for the week of Oct. 11-18, 1919, there appeared an article by Dr. L. J. Matos on this subject in which several instances are cited that might throw some information on the present case.

To restore these pinked goods to a salable condition, it will only be necessary to give them a light boil, or even a soak in a weak solution of soda ash or sal soda, when the coloration will vanish, and not return. If these goods are already in department stores, of course they will have to be sold at bargain prices, but the customers could be told how to handle them to make them white. The goods are not injured in any way.

Laying Out Pattern for Colored Warp

I am going on color and I have never slashed or run color before. I am running a set of seven beams 24s-2 warp, 292 ends to a beam; 6 beams 292 white, 1 beam 150 color and 142 white. This is a total of 2042 ends in set. My slasher comb has 400 dents and I want to lay this as follows, or rather I want it to lie on the loom beam 24 white, 1 color, 1 white, 1 color. There will be 75 repeats and I will make allowance for border. What I want to know is what is the best way to put this on the section beam and the best way to lay it in the comb. Will I need a finer comb? Can I reed this successfully 3 to a dent and not have my color mix up in weaving? (4915)

First you should lay out your pattern in the following manner: 24 white, 1 color, 1 white, 1 color. This gives a total of 27 ends in a pattern. Multiplying this by 75 repeats gives 2025 ends.

Start the first time with 21 ends white.

$$2025-3=2022$$

Finish with 21 white to make both sides uniform.

$$2022+21=2043$$

The salvage will require about 12 ends on each side.

$$2043+24=2067$$

The next step is to find how many ends of each color are required. This is done as follows: 24 white plus 1 white equals 25 white in one repeat. Multiplying this by 75 repeats gives 1875. Subtracting 3 ends which were deducted the first

time leaves 1872 ends. Adding 21 extra white threads at the finish to make both sides uniform gives 1893 white; and a further addition of 24 threads for selvages makes a total of 1917 white ends. Two colored ends in one repeat multiplied by 75 repeats gives a total of 150 ends of color. Adding the 1917 white ends and the 150 colored ends gives us a total of 2067 ends in the warp.

Color Beam

We must now proceed to find the best way to put this yarn on section beams. If we put the colored yarn on a beam by itself it would make a ridgy beam that would not run well on the slashers, 150 ends being too small a number. So it is best to put some of the white yarn on the same beam with the color. If we make this with three ends of white and two ends of color in each repeat for 75 repeats, it would give us 375 ends on the beam. Lay the pattern in on the warper as follows:

1 white
1 color
1 white
1 color
1 white

5 x 75 = 375 total ends.
375 — 150 (color) = 225 white.

Subtracting the 225 ends of white on the color beam from the total number of ends of white (1917) leaves 1692 ends of white to be put on the other six beams, or 282 ends on each beam.

We now have seven beams as follows:

1 beam 375 ends	375
6 beams 282 ends	1692
	2067

The next thing is to get this yarn in the comb on the slasher. Here we will have to get back to our original warp pattern which reads as follows:

24 white
1 color
1 white
1 color

The 24 white should be laid 3 threads in a dent for 8 dents. The 1 color, 1 white, 1 color should be laid in 1 dent. This

makes a total of 9 dents for one repeat. Multiplying the 9 dents for one repeat by 75 repeats gives 675 dents. Subtracting 3 ends on account of the start being made with 21 white, makes 1 dent less or 674 dents. Adding 21 ends to finish evenly, adds 7 dents, and adding 24 ends for the selvages makes 8 dents more, or a total of 689 dents.

A positive dent expansion comb is made with 24 sections, 30 dents per section or 720 dents. It will be necessary to have a thin rod in front of the comb on which to hang some drop wires, then drop one of these drop wires on each side of the white, where you have the two ends of color and one end of white in the same dent. This, we believe, will give you what you want the warp to look like.

Bleaching Cotton Yarn

As a matter of information, we will thank you to advise if it is customary, or advisable or practical to boil cotton yarn or twine before bleaching? (4848)

Cotton yarn is generally boiled under pressure in a kier with caustic before bleaching, although sometimes it is simply boiled out under pressure with water. The duration of the boiling-out depends somewhat upon the quality of the material, the twist and the ply. In most cases it varies from four to ten hours.

Streaks in Plating Hosiery

We enclose stock made from 150 denier artificial silk and plated with 60s-1 C. P. mercerized; also 60s-1 C. P. mercerized in the high spliced ankle and double sole. We are just commencing to make this sock, and we are having considerable trouble with the plating, as you will notice by the streaks running all around the sock. Our object in writing you is to find out whether you could give us any information whereby we could overcome the streaks as shown in the sock. We would thank you for any information that you can give us. (4912)

Among the requirements for perfect plating are to have uniform tension on both yarns, but one yarn with more tension than the other. We recommend compensating tensions. The ends are to be separated as much as they can be safely at the throat plate of the latch ring. Be very careful that the lower of the yarns does not pinch under the needle latches when they close. Have a short lead from the throat plate to the yarn drawing point to avoid wrapping against

too many needles to cause the threads to roll as the needles descend the stitch cam.

Advance sinkers to hold the stitch as early as can be without affecting the length of the stitch in the sock. Many knitters fail to realize the importance of having the yarn properly and accurately centered under the take-off yarn guides. Low take-off guides and a single balloon in the yarns is an aid to good even tension on the yarns. Any slackness in either end gives the yarns a chance to roll or cross on the needles as per the sample submitted.

Weight of Hair

Can you advise us regarding the average quantity of hair produced by either a cow hide or a calf skin; also the weight of a cubic foot of hair. If you can give us any assistance in finding out the average quantity of hair produced by a cow hide and a calf skin, together with the weight of a cubic foot of this material, we would appreciate it very much. (4913)

The superintendent of a prominent tanning company advises that they find the average amount of hair produced per cow hide is 3.87 lbs., or the average hair produced per 100 lbs. of hide is 11.03 lbs. This is usually sold on the basis of 70 lbs. wet hair per bushel, which is expected to yield 15 lbs. of dry hair. This figures 56 lbs. of wet hair per cubic foot.

High Gloss on Calendered Gray Goods

I should like to know how to obtain a high gloss on any calendered gray goods direct from the mill without materially reducing the width of the goods. (4922)

It is impossible to obtain luster or high gloss on gray goods without materially reducing the width. In the first place there is a possibility of using two classes of calenders. Well known bag manufacturers seem to prefer a 5-roll calender with two combination cotton and husk rolls and three metal rolls. Previous to calendering the goods are treated on a sprinkler with finishing ingredients consisting of the necessary water and either turkey red oil or sugar and glycerine. This finishing compound is usually applied by means of a brush sprinkler.

To aid in keeping the width out as much as possible, bag

mills use in connection with the calender either a 3-bar or 5-bar expander, or otherwise a revolving expander. If the inquirer requires more gloss than can possibly be obtained on a 5-roll calender, it may be well to give serious consideration to a 3-roll friction calender. The operation through a calender is likely to reduce the width of gray goods, reducing a fabric 37½ inches wide in the woven width to about 36 inches or 36¼ inches wide at the delivery end of calender.

Sizing Worsted Warp

I am sending you a sample of worsted yarn we are having difficulty in sizing for weaving. Can you send me a formula which will be useful? The warps contain about 4,000 ends and the weave is a 2 up and 2 down twill. There are 62 or 65 picks of 1/23 worsted. Some warps are for satin backs and contain 7,020 ends and are woven with a four-harness twill face and eight-harness back sateen weave. I would also appreciate it if you could give me any information on how to stop high and low sections on sizing frames.

(4908)

The sample of yarn sent is very good and should require very little size. On a similar quality a large worsted mill is using the following mixture: Gelatose, 60 lbs.; potato starch, 25 lbs.; glycerine, 3 lbs.; water, 100 gallons. Mix and boil for 20 minutes. Sizing warps for the constructions mentioned, with 7,000 ends or more, on a dressing frame is another thing and it is almost impossible to get perfect results. The way the mill referred to above handles them is to run the yarn dry on the dresser and size on the slasher.

A mill man replies to this question as follows: When you try to size a warp of the kind mentioned on a dresser frame you have got to expect more or less section streaks. However, if it has to be done do not make the size too heavy to dry easily. Make small warps of not over 4 or 5 cuts; the higher the sections are on the reel the more uneven they will be. Make the sections with all the ends your reel will take, and pull them on the reel as tightly as possible. Then with everlasting care and a lot of luck you may get fairly good work. But sizing on the dresser is poor practice. Dressing the warps dry and running them over on the slasher is the thing. I have made hundreds of warps that way and have never had any trouble with them.

Spinning Cotton and Wool Mix

Enclosed you will find a sample of stock ready for the cards and also a 25-yard reeling of the material after being carded. I am spinning it to 3½ run and find it almost impossible to keep even a small percentage of the ends up on the mule. I would like to have someone look over this stock and roping and tell me what to do, whether I should have more draft on the mule, whether roping is condensed too hard, etc. I am of the opinion that about 40 inches of draft on a 72-inch draft mule should be sufficient for 3½ run yarn. This is causing me a great amount of trouble and an early reply will indeed be fully appreciated. (4930)

Judging from the appearance of the sample of stock there seems to be insufficient oil on the wool to make it work satisfactorily on the carding machines. The wool should be thoroughly oiled, then run through the mixing picker once before adding the cotton to the batch. This method will prevent the oil from coming too much in contact with the cotton, which should be avoided at all times when mixing cotton with wool. It seems advisable to allow about 45 inches of roping to 72-inch draft of the mule, on the class of stock and size of yarn in question. The roping is condensed a little harder than it should be to insure good spinning. However, this is a natural condition when cotton is used in the mix, and makes it necessary to have a longer length of roping in spinning than would be required on a wool batch of the same counts.

Adding Luster to Cotton Knit Goods

Will you advise me what is the best dressing to give the maximum strength and luster to tubular cotton jersey cloth? (4925)

We do not know of a dressing that will give both maximum strength and luster on cotton knitted goods. There are recipes which will add luster to the cotton but are not intended to add strength. A knit goods dyer writes that Minerol F. Medium is used in his dyehouse and adds luster to cotton dyed yarn. As the inquirer wants maximum strength and luster the only thing we can recommend is a mercerized yarn. Of course this costs more than a dressing if such could be obtained. This is a chance for research work.

Scouring and Fulling Carbonized Wool Cloth

Under separate cover I am mailing you a sample of palm-oil soap and a sample of 58 per cent. light soda ash, two materials which we use in scouring men's heavy all-wool ribbed underwear. The batch is oiled with two quarts lard oil and two quarts mineral oil per 100 pounds of carbonized all-wool batch. Will you kindly advise how much soda ash should be used to saponify this quantity of lard oil. How much additional soda ash could be added before it would commence to destroy the soap. When we speak of soap being killed by the use of excess soda, please explain by chemical formula the action which takes place. How may the scouring man know when the limit of soda ash has been added to the liquor. Is there any lime in this soda ash? If so, what effect will this have on the cloth? What is an average quantity of soap and soda required to scour and full 100 pounds of clean carbonized wool cloth? (4903)

It is not possible to answer the specific questions in this inquiry without causing confusion and we will, therefore, deal with the general subject of scouring and fulling a carbonized wool cloth.

Any emulsion oil must perform its function of properly lubricating the fibre for carding operations and then be capable of complete removal by the scouring operation. Sodium carbonate or light soda ash is helpful in starting the oil and dirt during scouring, but it is almost impossible to assign a definite quantity capable of removing two quarts of lard oil per 100 pounds of wool stock used. In general, the dirtier the goods and the greater amount of emulsion oil used, the greater amount of soda ash that should be used.

Soda ash added to soap in any quantity will not destroy soap. If added in sufficient quantity to a soap solution, the soap will be forced out of solution and will rise to the top. This phenomenon has been spoken of as destroying the soap. Merely adding water will restore the soap to its usable form. The same result could be secured by adding salt to the soap solution. If lime is present in soda ash, it will demonstrate its presence by forming a milky solution. Lime combined with soap in cloth makes an insoluble soap, which is very likely to cause streaks.

If carbonized wool is used, which has not been neutralized, it is essential that the goods from the loom or knitting machine be neutralized in the soda bath before any soap is applied to the cloth for scouring or fulling operations. Pro-

vided neutralized wool has been used, the gray goods can be sent directly to a fulling mill and scoured after being fulled. Dependent upon the character of the stock used, a fulling solution containing from 2 to 6 ounces of soda ash and from 3 to 8 ounces of soap can be used. In fulling, enough of this solution should be used to keep the goods wet enough to prevent excessive flocking. Upon experimenting, we find there is no lime in the soda ash.

Painting Pipes; Removing Rust

We have trouble to find a paint that will afford protection to the pipes in our dyehouse. We have used ordinary paints, but they soon disappear from the pipes and are replaced by a bad coat of rust. We use in our processes soap, acids, ammonia, soda ash, etc. Can you tell us of anything that will remove the rust before painting and give us the name of a paint that will last a reasonable time after being applied? (4887)

In considering the subject of painting pipes or other materials that are exposed to various chemical fumes or liquors in addition to water, several precautions must be observed in order to obtain satisfactory results. First, the surface to be painted must be properly prepared, and second, the paint must be particularly fitted for the work.

The surface must be free from oil and grease, and absolutely dry when the paint is applied. In all protective coatings, in order to obtain proper adhesion of the paint to the material the paint must be thoroughly worked into the uneven surfaces. A surface may appear to be smooth, yet a magnifying glass will show considerable roughness. For this reason a fairly stiff brush should be used for the priming coat, at least, and the paint should be well rubbed in. Any oil or grease present will prevent intimate contact of paint and metal and results will not be satisfactory. The same objections apply to rust. Rust is really a scale, more or less loose, on the surface of the iron, and if it is not removed the paint will be on the scale, not on the metal; when the rust scale increases or loosens, as it surely will, the paint will come off with it.

Several methods can be used to remove rust, depending upon its nature and amount. For heavy work a stiff wire brush will be found the best. After the bulk is removed the work can be completed by using ordinary sand paper or

emery paper. For satisfactory work all rust must be removed.

The second consideration is the nature of the paint to be used. If there is expansion and contraction of the material due to changes of temperature it is evident that the body of the paint should be one that as it dries will be elastic, in order not to crack, blister or flake off. Also it should be one that will not soften under the action of water. Linseed oil paints give much trouble because they do not fully meet these requirements, particularly the first group. A very satisfactory coating for this purpose is made by mixing aluminum powder with a high grade acid proof varnish. This is thoroughly worked into the surface and a second coat applied. Frequently graphite is mixed with the second coat and then a third coat of the varnish is used. This varnish is particularly good where stains on cloth are to be avoided.

Galvanized metal calls for a special paint for the first coat at least, in order to obtain satisfactory results. When this metal comes from the galvanizing vats it carries on it an acid coating that prevents a linseed oil paint, for instance, from adhering, and if such paints are used they soon will peel. The first coat therefore should be a special paint made for this purpose, which will neutralize the acid covering previously mentioned. The second coat may be an oil paint of any good brand. Names of manufacturers of special paints for surfaces in dyehouses have been sent to the inquirer.

Weaving Silk Yarn in Worsted Goods

I am sending you a layout with piece of cloth and would like to ask what would possibly make the silk run well. The worsted runs all right, but the silk breaks more or less. It breaks between the harnesses and whip roll. The loom is set 5 teeth ahead on the top roll and 4 on the botton roll. The shed is about right. The silk is on the two front harnesses, which I think makes it run better. The 60s-2 silk is all right as far as I know. The warps are dressed with the silk run over a rod to keep it on top of the worsted when dressing, then beamed off on the front of the dresser which puts it on bottom of the worsted. It is run off bobbins. If you know anything that would help it I would like to hear from you. (4934)

There is a difference between the take-up of worsted and the take-up of silk yarn in weaving, which sometimes pre-

vents the good running of silk in the loom. In some mills the two yarns are woven from separate beams, when the take-up of each can be properly regulated. However, the silk threads in this case appear to be clean cut from each other in the weave, and thereby are made to weave tighter than the worsted threads. This evidently is the main cause of their breaking down. The silk yarn is too fine for the stress that is put upon it. The way to improve the condition is to lessen the clean cuts between silk threads in the weave as much as possible without the changes being plainly noticeable. The body of the fabric is woven with the common 4 harness twill and we advise having a clean cut only between the red and the orange colored silk threads which show most prominently. Put the two threads thus cut in the same dent.

Production and Seconds in Manufacturing Shirtings

I am enclosing a small sample of 37-inch shirting, 72 x 64 in the ground, which we are making in various patterns and on which we have not yet been able to get the production and per cent. of seconds that we would like. We have been running on plain print cloth up until recent months, and our help has to be largely trained for this class of goods. Our weavers run 10 to 12 looms, a fixer has 60 looms to his section, and we use one pick-out hand to the section and one smash-hand to two sections. Warp is 30s and filling 32s, spun from commerical one inch, or an average 15/16 inch cotton. We run our looms day and night. I would like to have your opinion as to what production and seconds we have a right to expect under these conditions, and would appreciate any suggestions on the running of these goods which would be likely to help us. (4932)

Although it has been the writer's privilege to study conditions in several mills which are engaged in the manufacture of fancy shirtings similar to the enclosed sample, he has yet to encounter a mill which uses cotton as short as 15/16 inch. The writer feels that the low weaving efficiency and the high percentage of seconds are direct results of the use of short cotton.

Mills successfully engaged in the manufacture of fancy shirtings almost invariably use cotton of at least full 1-1/16 inch staple for the warp yarn and commercial 1-1/16 inches for the filling yarn. In these mills weavers run from 14 to 18 automatic looms each; fixers have charge of 60 to 80 looms,

and there is one smash-piecer or pick-out hand for each 100 to 150 looms. The automatic looms in these mills run at speeds varying from 150 to 160 picks per minute, and maintain an average weaving efficiency of about 80 per cent., although weaving efficiency of 85 per cent. on automatic looms weaving fancy shirtings is not uncommon.

The percentage of seconds varies widely, and although the writer has seen cases where the percentage of seconds was as low as 3 per cent., he feels that any mill which does not produce more than 5 per cent. of second quality on fancy shirtings is keeping well within the average.

Although the inquirer does not state what weaving efficiency and percentage of seconds his mill maintains, his letter implies that they are not equal to those stated above. By employing better cotton he might expect his plant to equal, perhaps even better, the above described conditions, which exist in a great many New England textile plants.

Silk Throwing

What is the cost of throwing silk and winding it on cones ready for knitting purposes (10 and 12 thread)? In other words, what should be added to the cost of raw silk as quoted in the market in order to arrive at the cost of silk on cones ready for the knitting machines? (4927)

Only an approximate figure can be given as costs vary with local conditions. A rough figure on the cost of throwing and delivering the thread on cones is from 70 to 75c. per pound, plus an allowance of 2 per cent. for waste. The amount to be aded to the cost of raw silk is probably about 90c. per pound.

Numbering Artificial Silk

How is the denier of artificial silk arrived at? Given a weight, say 150 denier, how can we find out what number of cotton this equals? (4938)

Artificial silk is numbered on the same system as natural silk. In this system a 1 denier silk (in practice there is no silk so fine) would contain a length of 4,464,528 yards per pound. Dividing this by any given denier will show the yards per pound of that denier. If the yards per pound of any silk are known, dividing by the yards per pound will show the denier. For example, if you wish to know the yards per

pound in a 100 denier silk, divide 4,464,528 by 100, giving 44,645. If you have a silk containing 44,645 yards per pound, and wish to know the denier, divide this yardage into 4,464,528, which gives the denier as 100.

Taking your example of 150 denier artificial silk and finding out what number of cotton yarn this is equivalent to, proceed as follows: 4,464,528 divided by 150 equals 29,764. This is the number of yards in a pound of 150 denier artificial silk. The problem now is to find what number of cotton yarn contains this number of yards in a pound. In cotton there are, of course, 840 yards to a pound in a No. 1 yarn, so divide 29,764 by 840, which gives between 35s and 36s cotton yarn as the equivalent of 150 denier artificial silk. This method can be followed for any deniers or yarn sizes.

The Sauquoit Silk Mfg. Co., Philadelphia, Pa., compiled a comparative yarn table for cotton, spun silk, artificial silk and thrown silk yarns some years ago, and may have copies on hand which they would send on request.

Recording Thermometer and Pressure Gauge

What are the uses in the textile mills for long distance recording thermometers? What uses are made of the recording pressure gauge? (4940)

The long distance recording thermometer finds considerable use for measuring temperatures in dye kettles, washers, dry rooms and drying machines, open and closed tanks and kiers, etc. It is a useful and desirable instrument. In power houses it is used in recording the temperatures of feed water, condenser water, steam temperatures, etc. Considerable information on this matter is given in such articles published in TEXTILE WORLD as the following: "Importance of Temperature Control"—Oct. 29, 1921; "Controlled Temperature in Wool Scouring"—Dec. 27, 1919; "Measuring Temperature"—June 29, 1918; "Temperature"—Sept. 10, 1921; "Tests of Steam Consumption in Dyeing"—Nov. 26, 1921; "Automatic Control of Textile Processes"—Jan. 31, 1920.

The recording pressure gauge is an instrument that is in common use for many purposes such as in recording steam, water, air and gas pressures. Its applications are many and varied, both in the power plant and also out in the mill proper. Like the recording thermometer it is a useful and desirable instrument.

Yarn for Looping Hosiery

We have been using 50s-2 mercerized yarn for looping mercerized hose, and 36s-2 regular hosiery yarn for cotton hose. These are both rather heavy for the purpose and make clumsy seams across the toe. Can you suggest a more suitable yarn for this purpose? We thought perhaps a 90s-3 mercerized and 18s-1 C. P. cotton would be satisfactory. Any information you can give us will be appreciated. (4907)

A knitter replies to the question as follows: It has been our practice to use 3-ply thread for looping. We believe you will find 90s-3 and 100s-3 suitable for your work. Yarns do not run well on our loopers and we found that the increased production with the thread more than paid for it. Moreover we had better looking seams in the looping.

Fancy Tops for Golf Hose

I understand the H. Brinton Co., Philadelphia, build a machine for making fancy golf hose tops. What gauge and sizes, and how many such machines would be needed to furnish tops for a plant of ribbed hose machines (7/8 automatics) having a range of sizes and production as shown below:

No. of Machines	No. of Needles	Diameter (Inches)	Weekly Production
1.....	60	3½	14 doz.
2.....	64	3¾	32 doz.
2.....	68	3⅞	30 doz.
3.....	72	4	34 doz.
1.....	72	4¼	14 doz.
2.....	76	4	26 doz.
2.....	76	4¼	26 doz.
1.....	80	4¼	12 doz.
1.....	80	4½	12 doz.
Total weekly production.....			200 doz.

What machine or machines would be necessary to seam such tops on to the hose? Any information relative to the manufacture of golf hose having fancy tops made separately will be appreciated. (4933)

H. Brinton Co. reply to this question as follows: The machines listed show that this is a very coarse line, but we are unable to determine exactly what sizes of hose are being produced. We make the machines for making the fancy tops

in all sizes from 2¾ inches up, but on the line specified, we believe that three machines, one each of 4 inches, 4½ inches and 5 inches would answer the requirements. These three machines would make sufficient tops to take care of the weekly production as the average production from these machines is 15 dozen pairs of tops per day. If you can get further information from the inquirer as to what sizes of hose he wishes to make or have him send us a sample of this hose, we could then probably give more detailed information. These tops are sewed on to the hose, and we believe that the machine produced by the Merrow Machine Co. is generally used for the purpose.

Luster in Finishing

Can you inform me how the high finish is produced that we see on some bolivia cloths. Are they steam blown, and if so will just a steam brushing raise the nap or pile enough to restore the bolivia effect? I will greatly appreciate any information you can give me on finishing of bolivias, for it varies so much. (4942)

A finisher replies to this question as follows: Most of the luster on bolivia cloths is due to the class of stock used, although luster can be brought out by the finisher using good judgment in napping and gigging. We average from 250 to 300 pieces per week and have good results by the following processes: Goods are tacked, fulled, scoured, dyed, carbonized, neutralized, napped, cropped in the wet, gigged, using the raising machine previous to drying, process examined, steam brushed, sheared and tentered. Many mills the writer has visited steam blow before and after dyeing on a regular double steamer.

Bleaching Pearl Buttons

I am sending you some samples of pearl buttons that I would like to be able to bleach to a satisfactory white, as of course this dark coloration is a detriment to the best selling value of these buttons. I have tried different materials, such as hydrogen peroxide, potassium permanganite, lime bleaching solution, soda bleaching solution and potassium sulphocyanide, without much success, and so would appreciate receiving your suggestions as to the best method to use in the bleaching of these buttons. I am enclosing several buttons that have been bleached and finished and these will give you

some idea of the degree to which the bleaching should extend. Of course it would be better completely to bleach the coloring matter from the buttons, but if the results are as good as the enclosed samples, this would answer the requirements of the trade. (4946)

A practical method of bleaching pearl buttons is by means of hydrogen peroxide. We note you have used this material without much success, but did you use it correctly? Pearl is a very hard substance to bleach; the discoloration may be organic or mineral. Organic matter as you undoubtedly are aware is very easily bleached, but mineral matter is another problem.

The bleaching must proceed slowly as the pearl is very hard to penetrate. A hydrogen peroxide of 25 per cent. volume, known as albone, has been used with good results. It should be diluted to 50 per cent. strength with pure water (free from iron), made slightly alkaline with ammonia and heated to 100 degrees F. The buttons are entered and allowed to remain until the shade desired is obtained. This usually requires 72 to 80 hours.

The buttons are best bleached just before polishing, and better results could be obtained if the buttons were frequently agitated while in the bleach bath. Should it be impossible to keep the bath at 100 degrees F. throughout, keep this temperature during the daytime and allow the bath to cool down overnight.

Operation of Kiers

Have you any available data on washing and bleaching kiers, or can you refer us to a reliable source of information, referring to their general operation and particularly at what temperatures the liquor should be maintained, and what will happen to the material if the temperature varies widely? (453)

There are two distinct types of kiers, so far as construction is concerned; that is, the regular boiler metal kier and the old-fashioned wooden kier. The writer has seen cement kiers used, but these are not entirely successful, due to the fact that they are subject to cracking in the cement work, from the changes in the temperature resulting in contraction and expansion.

The uses of these kiers are as follows: For the boiling-off

and bleaching of raw cotton fibre or linters; the boiling-off and bleaching of cotton yarns in either skein or long chain form; the boiling-off and bleaching of cotton piece goods and union fabrics consisting of linen and cotton; and the peroxide bleaching in special low temperature kiers of all-cotton yarns, raw stock and fabrics, as well as silk and cotton, and linen and cotton goods.

The open kiers, whether they be iron or wood, are boiled at temperatures of from 160 to 190 degrees F. This method of boiling-off applies particularly to peroxide bleach as well as some forms of mild bleaching of high grade sheetings and such fabrics. When boiled under pressure, a kier would work at from 225 to 285 degrees F., depending on the steam pressure. This steam pressure runs from 5 to 60 pounds, depending on type of kier and method of circulation. As a rule, however, it is only the foreign made boiling kiers that use high steam pressures. The better known American makes of kiers work at from 15 to 25 pounds steam pressure.

The variation in temperature during the boiling of a kier is certainly detrimental both as to the evenness of white obtained and the degree of absorbency of fabric or yarn. Also it is likely to affect either dyed shades or fine finishes in the later process of bleaching, dyeing, or finishing.

When using the open boil for temperatures at 160 to 190 degrees F., it is important that a temperature control device should be functioning. On the pressure kiers, of course, it is relatively easy to control the temperature by keeping the steam pressure at a certain mark during the entire boil.

On the pressure kier there are two distinct types of circulating device, and of these distinct types, of course, there are many forms of appliance which accomplish the same results. The steam injector allowing direct live steam to enter the kier was probably the first method in use for boiling under pressure. For certain classes of work along the ordinary run of goods, this type of kier is being used to a great extent, and proves satisfactory, as a great many bleachers and finishers are using it with entire satisfaction.

Various types of motor pump and tubular heater kiers are also in use, which eliminate live or direct steam from entering the kier and reducing the liquors in strength.

In the writer's estimation, kiers are the particular piece of equipment in a bleach or print works that should be given

undivided attention by the man in charge, with the idea of obtaining even results, both as to temperature and length of boil, as the goods leaving a kier are treated in such a way that the processes following depend entirely on the base obtained during the boiling process.

Crinkled Mohair Effect

The enclosed sample was received from England and its construction is somewhat puzzling me. I would like to find out how the crinkled effect of the mohair has been developed so evenly. Would you kindly submit this sample to your expert on fabrics and let me know if a special attachment to the loom is necessary to obtain this effect. (4929)

The crinkled effect seems to be given by the weave employed, which protrudes the mohair yarn to the face of the fabric. No doubt the fabric is carefully singed and top sheared to remove fuzz and loose fibre.

Production of Machines and Labor Costs in Cotton Yarn Mill

The following information will be greatly appreciated by us for the purpose of ascertaining the economical operation of our mill. The mill is running on 12s single carded yarn using middling cotton. From the output of one 40-inch flat top card, how many pounds of 12s single yarn should we spin per day of 10 hours, and how many slubber, intermediate, fly frame and spinning spindles should take care of the product from one card? From this information we can figure the amount of yarn our mill should spin per day of 10 hours, and how many spindles of each we should run to turn out the capacity of our cards. It is our opinion we are running too many spindles of each for the number of cards we have. What is the labor cost per pound in spinning 12s yarn from middling cotton in the average southern mill of 5,000 spindles and what percentage of loss should there be in spinning 12s single carded yarn, using middling cotton, from the bale of cotton to the finished yarn? We will appreciate it if you will give this information by letter, as we are anxious to get it as early as possible in an effort to reduce the labor cost in our mill. (4956)

Since the inquirer makes no mention of the speeds at which he runs his machinery, nor the production per day at the cards, it will be necessary to assume a reasonable production

per card per day on which to base our estimates. Since local conditions, such as age and condition of machinery, layout of plant, skill of help, etc., play such an important part in the production and costs of production in a plant, it is possible that the conditions described herein may not be entirely applicable to the mill in question. It is the writer's hope, however, that these conditions, which exist in several southern mills, may be of some assistance to the inquirer in solving his problems.

Assuming the speed of a 27-inch doffer to be about 12 turns per minute, we might easily expect a production of 135 lbs. (in yarn) per day per card, our card sliver to weigh about 60 grains per yard. At the slubbers we should probably make a .60 hank roving and expect about 19.3 lbs. per spindle day of 10 hours. On the intermediate we should expect a production of about 8.5 lbs. per spindle per day, making a 1.25 hank roving. At the fine frames we should expect about 3.0 lbs. per spindle per day, making a 3.00 hank roving. On this basis it should be necessary to run 7 slubber spindles, 16 intermediate spindles, and 45 fine frame spindles to take care of the daily output of one card.

Here the writer might mention the fact that many mills making coarse yarns use single roving on the spinning frames successfully. In this particular case a 1.60 hank single intermediate roving might be successfully employed in the spinning room. This would greatly reduce the cost of production and yet not injure the quality of the yarn to any noticeable extent. A daily production of about 5.9 lbs. per spindle might be expected on this count of roving.

The inquirer does not state whether the 12s yarn he is making is warp, filling or hosiery yarn. The following conditions are based on the manufacture of warp yarn. The production per spindle per day on 12s warp yarn should be about .62 lbs. On this basis it would be necessary to operate about 218 spinning spindles to take care of the output of one card.

The labor costs per pound, as the production per unit of machinery, depend largely on the local conditions. The labor costs for the average southern mill, however, are from $.0175 to $.0200 per lb. of 3.00 hank roving; and the labor costs for spinning 12s warp yarn varies from about $.0095 to $.0110 per lb. An idea of the saving effected by the use of single intermediate roving is gained when one considers that the aver-

age southern mill can produce the 1.60 hank intermediate roving previously described for about $0.150 per lb. for labor. In a mill producing 20,000 lbs. weekly this means a weekly saving of from $50 to $100 in the payroll alone.

The percentage of loss from cotton in the bale to finished yarn varies from 12 to 14 per cent. In a modern plant using middling cotton, it is the writer's opinion that this loss should not exceed 12 per cent. in a yarn mill.

Identifying Stockings from Different Machines

We have just started running 150 denier artificial silk, twisted with two strands of Japan silk, making ladies' hose, on 240 needle, 54 gauge, 3½-inch cylinder machines, present speed on same being 230 to 240 R.P.M. Please advise if more satisfactory results as to seconds and waste can be obtained by reducing this speed, and if so, what speed would you recommend. Part of our machines are on plain work with the tuck stitch attachments, while others are equipped with sinker stitch attachments.

In order to check up lengths and knitting room work more thoroughly, we are arranging to take one stocking daily from each machine, carrying it through every operation, including dyeing. Do you know of any satisfactory system of ticketing each stocking so when it is finished we will know what machine it comes from? Our idea is to have each machine numbered and give the stocking from that particular machine a corresponding number. What is the most satisfactory thread for mending the grade of silk on which we will run? The heel, toe and top of the above mentioned stocking will be in mercerized. (4902)

We believe your machines are running at the correct speed. Some mills have made a practice of tacking sample stockings with soft cotton yarn. In order to identify the work from different machines they tack in different places in the stockings. For instance: the work from No. 1 machine would be tacked at the toe, from No. 2 at the heel, etc. Usually if stockings are knit a half size large the feet will finish correctly. The length of the feet can thus be determined as soon as the stockings are looped. The amount of the allowance required for the leg can be determined and the sample boards in the knitting room marked. By this method, which one mill has used for many years, they have a dozen looped from each machine and board them at the knitting room and obtain an average which we believe you will find to be much more accurate than

any test of single stockings. We would mend with a good grade of mercerized in the mercerized and with Japan silk in the silk part of the stockings. Referring again to identifying work from different machines, an interesting article on this subject appeared in our May 7, 1921, issue.

Weighting Silk for Hosiery

Is it advisable to apply weighting to 10 thread and 12 thread silk stockings in the process of dyeing and finishing? Does it add to the talking feature of a hose to say that it is weighted? Will it fetch a better price considering the cost of weighting to be about 40 cents a dozen? (4926)

If silk is to be weighted, the weighting should be done in the skein, and not in the knitted article. Silk hosiery is not weighted either during dyeing or finishing. There are manufacturers who use an eight thread pure silk and add the equivalent in weight of two thread to the eight, and make a hose as heavy as a 10 thread. As the dye is cheaper than silk a saving is effected.

The trade is being educated to the fact that weighted hose has a shorter life and consequently it is not a selling feature. We cannot believe that the fact that hosiery is weighted gives the seller any advantage. We know of one establishment, a department store in a large city, that advertised for the return of all of a certain lot of stockings that were sold, and which were found to be quite unwearable; the advertised cause being that the dye used was "too strong" for the weight of the silk. As a matter of fact the real trouble was that the silk had been overweighted. We might here make mention that no dye for silk, when properly applied in a workmanlike manner, ever injured that fibre. Weighted silk is always inferior to "pure dyed silk."

Bleaching Blankets

A number of our customers have requested us to make a pure wool white blanket. We buy all our wool from local farmers and find a large portion of it badly stained. Can the stain be removed and can you recommend a bleaching process that will assist us in producing a pure white finished product? (4945)

If you desire colored borders in your blankets it would be preferable to bleach the yarn. If no colored yarns are to be used in the blankets, it is best to bleach the blanket when

finished. There is no reason why a passable shade of white cannot be obtained on the wool that you mention. When speaking of a white on wool it is usually supposed that a cream white is meant. Whether bleaching the yarn or the blankets, the peroxide bleach will give a permanent white. A wooden or concrete tub with false bottom, free from all metal excepting lead, heated indirectly by means of a lead coil, should be installed for bleaching. The yarns or blankets previously scoured with 3 per cent. soap and 1 per cent triphosphate of soda are bleached as follows:

To every 100 gallons of water add 3 gallons of albone (25 volume hydrogen peroxide), 2 pounds silicate of soda and ½ pint of ammonia. Heat to 125 degrees F. and allow to bleach 6 to 7 hours. Then soap and rinse with warm water and finally with cold water.

Should a better white be desired, the above bleach can be topped with a sulphur bleach. This, however, is not permanent. This is given by subjecting the damp material in an air tight room free from metal (excepting lead) to the fumes of burning sulphur overnight (5 pounds sulphur per 1,000 cubic feet). In the morning give one cold rinse to remove the sulphur odor and then finish. Although this double bleach gives a better temporary effect, the single peroxide bleach is usually satisfactory for all practical purposes.

Single Roll vs. Two Roll Washers

In the bleaching and washing of our goods we have been experimenting with just one roll in the washing machine. Opinion is divided as to whether we get as good a wash with one roll as we do with two. We have been told that experiments have been conducted along this line and in every instance showed that the wash over one roll proved to give a better wash. We are inclined to believe that the squeezing effect of two rolls is better. We would appreciate several opinions in regard to this and also reasons for the opinion. (4960)

The inquiry is a bit indefinite and consequently rather hard to answer in a satisfactory manner. No tests have been run along these lines to our knowledge, but we feel certain that any results obtained would depend in a large measure on the kind of goods being run. We rather incline to the opinion that thorough washing and scouring would be rather difficult to obtain in the ordinary wet finishing machine with-

out the use of squeeze rolls. It is true that there are reel machines for the dyeing of woolens and worsteds which have only a single front roll, and it is also true that dyes are satisfactorily and uniformly distributed through the piece without the use of squeeze rolls. However, this appears to be a different proposition from the removal of dirt, grease and foreign matter. Reel machines which are used for bleaching and washing are most always equipped with a pair of squeeze rolls instead of a single front roll.

A cotton goods bleacher and finisher replies to the inquiry as follows: A great many bleacheries during recent years have changed their strand washing machines, or had new ones constructed, with only one driven roll instead of the two used to a great degree previously. The writer doubts very much whether this type of machine will give a better wash, as any practical man knows that the more often a piece of goods is nipped or squeezed in the washing machine the better and quicker a complete wash is effected.

The chief reason for using the roll type of washer is because of its giving the goods a lighter treatment, that is, as far as pulling the goods warp-wise in strand form is concerned. The greatest point in favor of the single roll bleach house washer is that continuous operation without tie-ups or tightened strands is more readily obtained than with the two-roll type. Then again, on lightweight goods the treatment on this type of washer is not as harsh or rough as it would be on the two-roll type of washer. The writer would not recommend, however, the use of the single roll bleach house washing machine for such goods as wide sheetings or really heavy goods.

Yarn from Artificial Silk Waste

Enclosed you will find a small sample of yarn which is being used for a cotton back bolivia. Will you please tell me what material it is, and if possible what gives it such a good luster. About how fine could it be spun? (4954)

The yarn is made from artificial silk waste, which is gilled, combed and then drawn on the English system of open drawing or cone drawing. It is better to spin the yarn on a flyer frame if possible. We are sending you a sample of similar yarn made at Lowell Textile School, which is about 11.5s worsted counts. This is finer than your sample, but is not

by any means as fine as the material can be spun. The luster of the material is due to the structure of the fibre, which has a very smooth surface and reflects the light to a high degree

A mill superintendent replies to this inquiry as follows: The sample sent with the question is a single 8s fibre silk yarn. The writer has spun similar material to 24s, and knows of cases where it is spun much finer than this. The luster of course is due to the nature of the artificial silk fibre.

Curl in Flat Knit Fabric

We are enclosing sample of a flat knit fabric made on plain spring needle machine. The yarn used is 40s cotton unbleached. We would appreciate any information you can give us which will help us to prevent this material from curling and rolling back, as we are having a great deal of difficulty handling it on our finishing machines.

(4965)

There are many methods that have been tried with more or less success for preventing curl in knit goods. Any flat work will curl on cut edges. A ¾-inch cylinder, single thread tube used for finishing purposes will twist half way around and back again in one yard at certain times. On large sizes this is not noticed, but when rolled up and cut into lengths, the curl is very noticeable. A cutter generally lays a heavy weight on one end of each length cut off, using his shears for a weight at the other end, while laying out another length. This applies in nearly every case on flat work. The following give ideas as to the practice followed by some mills:

One large concern in the Middle West uses a steam box for all flat work. Instead of being rolled up, the goods are run through a steam mangle and come out in layers. These layers are tied at each end loosely and laid on a shelf in the steam box where live steam is soaked into them until they are damp. These goods are then cut at once. The edges curl some when cut, but not as much as they otherwise would.

A large New York mill has a live steam jet, that is, there are two pipes about a foot apart and full of little holes that blow live steam through the fabric as it is pulled off the roll on the cutter table. The cutter remarked once that this helped to make the goods lie flat.

Another large New York mill uses a solution of soap and oil on the yarn. This is absorbed by running over a wet roller on the winder and the fabric will still be damp the next day. They make great claims of better work but there is still some curl left. This same mill once tried two yarns on the frames, a right and left-hand twist, thinking this would overcome the curl, but it failed.

Spring needle knitters have tried for over 150 years to overcome the curled edges of their cut work and at a knitting manufacturers' convention in Philadelphia some years ago this question took up a whole day of their time, but without finding a remedy.

Since that time a mangle made by the Curtis & Marble Machine Co., Worcester, Mass., has been used with success in some mills in conjunction with a turning pipe and spreader made by the Grand Rapids Textile Machinery Co., Grand Rapids, Mich. A jet of live steam is used through the turning pipe, and finishing between the hot rolls the goods give no trouble. A machine has also recently been brought out by George W. Lindley, Germantown Machine Works, Philadelphia, for preventing curl in flat fabrics. These manufacturers of equipment would be glad to go into the matter further with the inquirer.

Finishing Cotton Crepe

I enclose a sample of cloth which we want to make. It is called crepe. Please let me know particulars of finishing. (4974)

This inquiry is from a reader in Ceylon. According to American practice this class of goods, after sewing together in the gray room, should be saturated through a light mangle or single compartment machine and run into the boiling kier with as litttle tension on the warp as possible. It is the custom to boil these goods in the kier for 8 or 10 hours with about 3½ per cent. caustic soda on the weight of goods, taking care that the goods are properly covered with liquor during the boil. Steam pressure on the kier should be 12 to 15 pounds.

After thoroughly washing down and the boiling operation is completed, the goods should be reeled over into a bleaching cistern. The usual size of this bleaching cistern would be 6 feet dimensions all around. The cistern is fitted with

a false bottom and the tank itself is made from 3 to 4-inch cypress. Circulation is by means of centrifugal pumps for both the chemic or bleaching liquor and the souring or neutralizing liquor. The complete bleaching (chemicking) and souring operations should be taken care of in this tank with a thorough washing between the two processes by means of pump circulation on all operations.

After the final souring and washing, the goods can then be washed through a slack washer about 8 feet long (this washer should be similar to a dolly washer) and placed in the white racks completely bleached, care being taken to squeeze them well before they are put into the white racks to remove the excess water.

From here they are opened and sent to drying machines of the regular cylinder type. After drying, they are padded on a 2-roll padder with the necessary color to obtain shade and dried over a range consisting of six drying cylinders and a 60 to 90-foot long automatic clamp tenter to obtain even width and finished appearance. At the delivery end of a tenter they are wound up on a 2-drum automatic winder in rolls of 600 to 800 yards and taken to the folding or putting-up department for either winding on boards or doubling and rolling up, being put in 40 to 60-yard pieces ready for the market.

Effect of Mercerization on Wearing Quality

We have been confronted with a question relative to mercerized yarns which we are unable to answer in a satisfactory manner. We are therefore taking the privilege of asking you the following question: Does mercerization increase the strength and wearing qualities of yarn? We would greatly appreciate it if you could give us this information. (4958)

Mercerization greatly increases the strength of cotton yarns, and as the wearing qualities of textiles are largely a matter of tensile strength, it follows that mercerization also increases the wearing qualities. The effect of mercerization in increasing the strength of cotton yarns may be offset to some extent by later bleaching of goods, but if the goods are properly processed, even in full bleached form, the increase in strength over the gray or natural condition of unmercerized material should be 8 to 10 per cent.

Production of Worsted Yarn

Have you any information at your disposal regarding the production per spindle of worsted spinning machines. What we would like to know is what do the American worsted spinners figure on by way of production per spindle of 2-18s worsted, spun on Bradford system. Also can you let us know about how many spindles per machine are being operated in American mills? (4971)

This question does not give the grade of wool that the 2-18s is to be spun from. As some grades take less twist and some grades take more, we will assume a medium quality. With this the production will average about 3½ to 4 pounds per spindle of cap spun yarn, according to local conditions in the mill. Mills use mostly 200-spindle frames.

Caustic Consumption in Skein Mercerizing

What is generally accepted in the trade as a fair caustic consumption per pound of yarn in skein mercerizing? We will consider 40s-2 combed and carded yarns and make no allowance for caustic recovery. Does the consumption vary to any great extent with the count or twist? As compared with the 40s-2 what would the figure be for 100s-2, 60s-2, 20s-2 and 5s-2, if any great difference? (4982)

Caustic consumption in skein mercerizing depends a great deal on the type of machine used. Machines that are equipped with rubber squeeze rolls for squeezing out the excess of caustic liquor so that it runs back into the tank, result in a considerable saving of caustic. Other mercerizing machines that are not fitted with squeeze roll devices of course allow a larger consumption of the caustic liquors due to the fact that a large amount is wasted.

The minimum consumption of caustic liquor in mercerizing, where the best type of squeezing rolls are used, could be taken as a little more than one-half pound of caustic to a pound of yarn. The maximum consumption, where the machines are not provided with squeeze rolls, could be taken as approximating a pound of caustic to a pound of yarn.

Differences in the counts of yarn have very little, or no effect on the amount of caustic consumption. However, a cord yarn, for example, like a 6-ply, would have a tendency

to hold more caustic than 2-ply, so the consumption would run higher in this case. Single yarns undoubtedly absorb more caustic than ply yarns of similar size and in the latter case it is more difficult to wash out the caustic liquors. Single yarns have a tendency to mat together, which holds the caustic in suspension. The principal difference, however, in caustic consumption depends largely on the machines in use and the degree of squeezing that is given the yarn after leaving the caustic liquors.

A mercerizer of yarns replies to the question as follows: It is a generally accepted fact in the textile trade that the consumption of caustic soda in yarn mercerizing, particularly on skein process, would be from three-quarters of a pound to one pound per pound of yarn. It has been the writer's experience that there is no great variation in the consumption, particularly if the goods have been well boiled out before mercerizing.

A concern doing business on this class of work would, of course, probably waste more caustic on the finer grades of yarn. This all depends on the type of skein mercerizing machine in use. We know that there are concerns claiming to use 6½ ounces of caustic soda to every pound of skein yarn mercerized on counts from 30s to 60s, 2-ply. These concerns have a foreign made machine which is mounted in a cast iron basin from which they are able to take very strong caustic after the skeins are squeezed before washing, and use the solution again by a slight building up with stronger liquor.

We also referred the question to Ernest Scott & Co., Fall River, Mass., makers of caustic recovery equipment, who comment as follows: The majority of mercerizers in rough figures calculate that one pound of yarn will require liquid caustic soda equal to one pound of solid 76 per cent. caustic soda. This figure is used in making calculations as to the amount of caustic soda required to mercerize the given amount of yarn and can be assumed to be a fairly safe figure. We have, however, in the numerous equipments that we have built for the recovery of caustic soda from the mercerizing of yarn goods found that the quantity may be as low as 0.6 of one pound of solid 76 per cent. caustic per pound of yarn; the average, we believe, is nearly 0.7. It is, of course, only natural that the heavier counts will absorb more caustic.

Labor and Overhead Costs in a Woolen Mill

If possible, please advise us the approximate costs of labor and overhead for operating a 50-loom woolen mill, steam power, belt driven, average 40 picks. (4981)

The following reply has been compiled from data having to do with several mills of a like capacity, and gives average figures for conditions today. Of course it is to be understood that conditions in every individual case are unlike, and to get accurate figures without intimate knowledge of specific conditions in this plant would be impossible. Nevertheless, it is believed that the figures will prove to be very close to actual results. The writer has based these costs on a production of men's wear woolens, which are the character of goods manufactured by the inquirer.

DYEING. We will first consider dyeing, assuming that raw wool is purchased scoured, and shoddy in its finished stage. The dyeing capacity for 50 looms manufacturing this class of fabrics should be about 80,000 pounds of raw stock per month. The average direct labor per pound would be approximately .0154, or $1,232 total direct labor. These figures are based on open kettle process. As we have no basis for distributing overhead by departments, this item will have to be based on entire direct labor method, and will be discussed later on.

MIXING AND PICKING. On an average production for 50 looms of 80,000 pounds, direct labor costs per pound should be approximately .0065, or $520 total direct labor.

CARDING. To operate 50 looms at 100 per cent. production, an average of 9 or 10 cards would be necessary on a basis of 80,000 pounds of roving, entailing direct labor costs of .0147 per pound, or $1,176 total direct labor.

SPINNING. Based on 10 mules to handle this production, on a piece-work rating, direct labor would amount to approximately .0222 per pound, or $1,776 total direct labor.

WEAVING. In this department we will combine the operations of spooling, dressing, drawing-in and weaving. Based on 30,000 yards or 70 per cent. possible production, the cost per pick should be approximately .0092, or a total direct labor charge of $11,040.

FINISHING. For the ordinary finishing operations, such as fulling, napping, pressing, burling, sewing, etc., the cost per yard should be approximately .0952, or based on an

average production of 30,000 yards, a total direct labor charge for a month of $2,886. The writer is not considering any special operations, such as chinchilla, etc. As many mills of this class produce a chinchilla fabric, it may be mentioned that costs on chinchilla operation per yard is approximately .0135 for direct labor only.

OVERHEAD. Below is presented an average list of items comprising the overhead per month in the average mill:

Superintendence	$800
Foremen (all departments)	2,000
Indirect labor	3,000
Indirect material (dyes, chemicals, etc.)	3,500
Repairs, buildings and equipment	1,200
Water, light and gas purchased	250
Depreciation, buildings and equipment	2,500
Insurance	200
Coal	400
Power house expense	500
Receiving and shipping expense	400
	$14,750

Summary

Direct labor—dyeing	$1,232
Direct labor—mixing and picking	520
Direct labor—carding	1,176
Direct labor—spinning	1,776
Direct labor—weaving	11,040
Direct labor—finishing	2,886
Total direct labor	$18,610
Overhead	14,750
Total labor and overhead	$33,360

Based on a 40-pick layout, averaging 70 per cent. possible production, or 30,000 yards per month, the cost per pick would be .0278, and cost per yard $1.112.

Change of Shade in Colored Shirtings During Chemicking

I am writing to determine whether or not you know of any material that can be added to bleaching liquors to prevent the change of color that always occurs on colored yarn shirtings during the chemicking operation. This is especially true of the blues, which are changed over so that they have

a greenish cast and this necessitates hydrosulphiting to restore the colors to their original shade. What we would like to obtain is a material that can be added to the chemic liquor so that the colors would be very little affected by the treatment and so that we would not have to hydrosulphite every lot. I would be glad to receive any references in the literature that you may know about on this subject and trust that you will be able to help us out. (5006)

We know of no material that can be used to prevent this change from blue to green in the bleaching of vat blues which the inquirer refers to. There are on the market at the present time, however, certain types of vat blues that are not quite so sensitive or subject to this greening in shade in the bleaching operation.

A finisher replies to this question as follows: In the bleaching of colored yarn shirtings with chemic or chlorine liquor, to the writer's best knowledge the only material or chemical that can be added to the bleaching liquor is soda ash. Most bleachers and finishers on this class of goods use exclusively a very mild strength, not more than ½ degree Tw. of chemic, with the addition of sufficient soda ash to give a properly balanced so-called soda-chemic which is a very mild bleaching liquor. We would refer the inquirer to Percy Bean's book, "The Chemistry and Practice of Finishing," for knowledge as to how to make and control the action of soda-chemic.

As regards the tendency of blues to change during the chemicking process, this is the experience of most everybody in the bleaching trade. If the inquirer is intending to produce even and uniform products, I fail to see how he can expect to get results without using hydrosulphite on all of these colored yarn goods to bring back the brightness and original tone of the colored stripes.

Uneven Silk Fabric

We are enclosing sample of a fabric which consists of combination of viscose 150 denier artificial twisted with two ends Japan tram. It was knit on a 240 needle machine. Please advise us your opinion as to just what causes the irregular stitches or wavy effect in the fabric. (4985)

The unevenness in this fabric is due to the uneven drag on the yarn from either the cone or the bobbin upon which the fibre silk twisted with two ends of Japan silk is wound.

Knitting Silk That is Too Dry

We would appreciate an expression of opinion as to what causes the lines which appear crosswise in the fabric enclosed. They seem to appear with a marked degree of uniformity. Any information you may be able to give us will be very much appreciated. (4987)

The cause of the lines appearing in this fabric is the failure of the manufacturer to keep the silk properly conditioned during the process of knitting. In other words, the silk is too dry when being knitted. This will produce the defect shown in the fabric submitted.

Quantities of Yarns Used in Silk Half Hose

Will you kindly tell me the amounts of mercerized yarns and the sizes, and also the same for silk, in a men's half hose of pure Japan tram silk and mercerized tops and heel and toe with silk reinforced in high splice and sole. The silk is to be 12 strand and the stockings to be made on a 3½ inch, 240 latch needle circular knitting machine. I desire these weights of the material as the sock comes from the machine and before the double sole is cut out, etc. (4975)

We have found by experience that many things vary the amount of yarn used in knitting hosiery, such as the setting of the knitting machines, the quality of the yarn used and its condition, the gauge of the needles at the hooks and of the sinkers at the throat; and the drawing angle of the stitch cams. These are such vital factors that we have found it necessary to ravel an average stocking in total weight and then weigh very carefully the component parts in order to make a cost analysis which could be used as a basis for manufacturing. We have found it possible to check our figures by weighing the yarn before making a dozen stockings and then deducting the amount remaining on the machine. The weights of the different yarns used divided by 24 should check with the weights obtained by raveling.

The manager of a large hosiery mill replies to the inquiry as follows: The proper size yarn to use in the ribbed top would be 34s-2 mercerized. The quantity used in one dozen ribbed tops, including waste, is 5 ounces. Quantity of 12 thread silk used in leg and foot is 7 ounces per dozen. The proper yarn to use in the heels and toes would be two threads of 60s-2 mercerized. The amount of yarn per dozen in heels

and toes is 3¼ ounces. The proper size silk to use for splicing high splice and double sole would be five thread. This should be a boiled-off silk in order to get the best results. The quantity used in one dozen pairs would be approximately one ounce.

Woven Label Production

I am looking for some kind of card system or formula, whereby I can tell what a loom is capable of turning out in yards and what the actual production is. Our looms are Fletcher ribbon jacquard looms with different numbers of spaces and shuttles running from one up to six bank. Of course it would be an easy matter for me to find out what a loom can produce and what we actually do get from the loom (in yards) if it were an ordinary ribbon loom where the goods would be woven the same all the way through, whether it would be a one, two or more shuttle job.

This being a woven label factory makes a big difference. A weaver might put on a pattern and only weave a couple of yards, and this label would not run the same all the way through. He may weave a half-inch of plain and then go to one-quarter inch of figure, and then back again to the plain, and so on for the length of the label, say about two inches. And again he might put on a pattern that would run 50 yards.

Again another weaver would put on a set of cards that would run about the same way, using any number of shuttles up to six bank; some of these shuttles might give only a dozen picks in the whole label. The take-up motion only works on the ground shuttle; it does not take-up when the figured shuttles are working.

What I am after is some kind of card system or way of keeping a record whereby I can see by day, week, month or year what the output of the loom should be and what the actual production is. Of course we have to take into consideration the time lost through changing, repairing and mistakes with the cards, waiting for loomfixer to do repair work, waiting for warps and the twisting of same.

(4812)

To establish a satisfactory production and cost system for a business of this character, where conditions are so changeable, will necessitate the careful tabulation of various details over a considerable period of time so as to be able properly to determine the actual production and cost of goods and make charges for the use of any particular loom.

The actual cost of designing, card cutting, lacing and the material used in the different sets can, of course, be ascertained for each particular job, but it will be necessary to have a tabulation of all designs, indicating number of cards employed on both the ground and dead picks so as to enable proper calculations to be made to establish a computation of time likely to be consumed in the weaving. The basis can be the yard or any other unit and figures can be calculated on loom speed with proper allowances for stoppages, which may be drawn from a loom card system.

No. Loom ----- Spaces ----- Banks ----- Picks per min.----- Weaver -----

Date	No. Patt.	Yds. per Shuttle	Total Yards	Twisting hrs	Twisting min	Weaving hrs	Weaving min	Changing hrs	Changing min	Fixing hrs	Fixing min	Total hrs	Total min
		Total											

Fig. 1. Loom Card for Production Estimate in Weaving Narrow Fabrics

Costs will have to be regulated in a measure by the quantity of goods ordered of any particular pattern, on account of the expense involved in changing designs at looms and other adjustments which usually accompany such changes. Reasonably correct calculations of this kind can soon be established by careful and persistent study and tabulation of details on various patterns.

We would suggest first of all a book arranged to receive swatches of all woven designs, properly numbered, with spaces to indicate all ground picks, dead picks and total picks in the design, together with picks per inch in the

woven fabric. This will afford a basis for figuring production on straight runs, without stoppages.

It should be augmented by a loom card so arranged that all details of operations and necessary stoppages can be properly recorded, with time expended on each. Such records may afterward be systematically drawn off and would soon afford sufficient data, so that intelligent production estimates and charges may be based on them instead of depending on snap judgment, which often leads to conclusions that are misleading. The form at Fig. 1 might form the basis for a loom card, but experience will suggest changes or additions to make it fit any particular business.

Artificial Silk Injured in Dyeing

We are sending you under separate cover samples of hosiery, dyed and undyed, composed of wool and artificial silk. It will be noted that in the ones dyed, the artificial silk seems to be dissolved in spots. Kindly advise us if this is the fault of yarn or the dye. This hose was made in January of this year and stored in a dry place, and has just been dyed. As these spots appear on every pair, we are sending you one that is not dyed. (4969)

Careful inspection of the artificial silk at the spots where it seems to have been "dissolved," shows that the ends of the fine fibres are abruptly broken off, as if by rubbing. If they had been dissolved, as suggested, the fibre substance away from the broken ends would show the effects of some solvent action, the presence of which is entirely wanting. The trouble seems to be the result of an excessive working of the stockings while at too high a temperature. It is to be remembered that artificial silk is very weak when wet or moist, and in that condition possesses low resistance to friction or rubbing.

The trouble is neither with the yarn nor the dye used. The weakness of artificial silk when wet is a well-known property of that material, while no dye, of itself, has ever been known to inflict injury to the fibre. Of course, it is possible that an error may have been made in preparing the dyebath for the wool; such an error might have consisted in adding too much acid, which also acts detrimentally on artificial silk at elevated temperatures.

Our suggestion is that in dyeing future lots of this material, the temperature be only so high as to permit the wool being

dyed in a satisfactory manner, and that the hose be not worked any more energetically than is necessary to permit a thorough saturation of the goods with the dye liquor. Follow by a good rinse to insure the complete removal of all remaining traces of any acid used in dyeing.

Hosiery Seconds

In the sale of our seconds of 240 needle mercerized ladies' hose, a question has been raised as to the proper classing of goods. We will very much appreciate your writing us as to the popular interpretation in the trade of seconds in ladies' mercerized, with as near a working rule as can be given on paper. Especially mention if a 1 or 2 inch neat mend above or below the boot would class as a third, as well as the correct classing of 1 needle run the length of the stocking. (4979)

We believe this question will never be satisfactorily answered until the hosiery manufacturers cooperate with the Bureau of Standards at Washington and establish correct standards. We knew of one manufacturer who made an exceptionally fine line of hosiery and nothing went into first quality which had the least imperfection, not even the fastening of a stitch which was missed at the transfer.

In two well known mills with which the writer has been connected the practice has been to classify in the final inspection. Firsts should not have any mends which can be detected by the eye; seconds would have small mends; thirds anything which could properly be mended. Torn or badly damaged goods were sent to the scrap box. This classification would place a one or two-inch mend and a long drop stitch as thirds probably.

Cloth Split in Fulling

I am having trouble in fulling baseball goods like sample, which is a hard woven fabric with all the picks it will stand in weaving. It should weigh 12 ounces finished. The goods come off the looms 15 to 16 ounces. We stretch out all we can, sometimes 2½ yards. I have had all the rolls on fulling mills turned down or new lags put in and have trouble just the same. Sometimes on both cuts on the same side of mill and in one mill that will take six cuts of cloth, three to a side, I will have one with holes out of six. I tack the goods

but don't seem to do any better then than with pieces that are not tacked. Now I think the trouble is in the stock, as we have a lot of cockly goods and uneven in places. I claim the trouble is in the card room where the cards are so badly gummed up and make splits from ¼ to 2½ inches. This sample of the split is like what we get on all the goods, white or colored, and from yarn that was left over from time to time. (5008)

We imagine that the warp is too crowded at the start, and with "all the picks it will stand," creates a condition that is very likely to cause splits in the cloth. With the weave used, which is the hardest possible for fulling, the trouble is accentuated. When the fulling proceeds to a point where the warp is so closely packed that it cannot go further, something must happen, and the very tendency to full under difficulty will cause breaks of this kind.

Of course poor carding and poor stock may make it worse, but good fulling stock is not a guarantee against it. With the tendency to still continue to shrink, with no room to do so, these splits will occur. When under these conditions the cloth becomes stiff and rigid it tends to break in the folds, as in folding a piece of cardboard.

We are not sure that the crowded condition of the threads is the trouble in this case, not knowing the construction of the cloth. But the writer had just this kind of difficulty and found that a change in the construction was necessary to remedy it. It is probably a case of trying to do the impossible in the fulling mills.

We would be glad to have the layout, stock, size of yarn, and time of fulling, for further consideration of this problem.

Sericised Cotton Yarn

What is the nature of sericised cotton yarn which I have seen advertised in an English publication? (4719)

The name sericised is applied to a lustering process for cotton yarns introduced by a progressive firm of cotton manufacturers, Burgess, Ledward & Co., Ltd., of Manchester, England, in 1920. The exact process has not been made public.

The chemical changes produced in cotton by this sericising process are similar to those produced by mercerizing. Thus, sericised yarn gives the same reaction with zinc chloride iodine solution as does ordinary mercerized yarn. The sericised yarn

has, however, a greater luster and this enhanced luster is more marked when American cotton is treated than with Egyptian. Sericised American cotton has a luster equal to an ordinary mercerized Egyptian yarn of the same counts and structure.

The process originated from a series of investigations concerning yarn mercerization for the production of airplane fabrics of great strength. In several of these experiments the luster was distinctly better than that of ordinary mercerized yarns, thus indicating the lines on which further efforts should be pursued.

The final method evolved after following various side tracks was a process not mentioned in the patents of Mercer, Lowe, Thomas, Prevost, and others. To distinguish this new method from ordinary mercerizing, the new term sericising was adopted.

Finishing French Crepe

I am enclosing a sample of "French crepe" which is something new in my line. This sample has been dyed and you will notice the heavy creases due to the scouring, which we cannot overcome. Can you tell me the proper way to handle this class of goods? These goods form the crepe effect in the scouring and you cannot crab them. Does the heat of the press have any effect on the crepe? These goods are 63 inches wide before scouring, 56 inches wide before dyeing, and about 54 inches wide before drying. The way we handle them is to scour, dye, extract and dry. Will you please let me know the proper way to handle these goods in order to have a nice crepe effect without the heavy creases I have mentioned? (4964)

A finisher handling this type of fabric replies as follows: The yarn twist and cloth construction of a crepe are the most important factors for finished results. We have time and again had the same trouble and have always been able to trace it to the yarns used. We handle crepes the entire year round, using the same method as mentioned by the inquirer, only we singe before dyeing. We proceed as follows:

Scour in soap 20 minutes. Wash off 45 minutes, keeping the water at a low temperature of about 110 degrees. It should be noted that a full bath is necessary to keep the cloth floating as much as possible, using a small pot-eye or sticks to keep the goods as compact as possible, making a good cushion under roll. Extract, singe, dye, examine, shear and tenter.

If plenty of width is given, run over tenter loose and give plenty of steam. Do not press or roll. Keep in the open width as much as possible.

When we have trouble with poor ends much can be done with this class of goods after dyeing by making a weak solution of acetic acid and running in a push hammer mill just a few minutes to break up the creases or wrinkles; then wash off cold in the kettle.

Another method is to press the fabric as hard as possible, then steam and tenter, with plenty of steam to get the crepey effect. You will find these two methods will help considerably.

Barred Effect in Elastic Web

We would be glad to have your opinion as to the cause of the striped effect in the sample of cotton garter elastic attached. This is more pronounced in certain lights, but very little while this trouble crops up, a light bar effect across the web about every ⅜ of an inch, running regularly for yards at a time. (4950)

The barred effect appearing in the sample of ¾-inch cotton cable elastic web submitted arises from the use of imperfectly dyed filling. The stripes or bars are seen at intervals of about 54 inches of yarn used, which is the repeat around a skein. This shaded effect in dyeing may arise from a variety of causes, and may come from almost any one of the different processes necessary in this work. It may arise from poor packing in the kier for the boiling process, where some of the yarn can be so tightly packed that a uniform flow of liquor through the yarn does not take place.

The unevenness of shade may come from the dyeing process itself by allowing some parts of the skein to be longer in the liquor than other parts. It may have been caused in the drying process, where the air circulation has not been properly distributed over the entire skein. Poor packing in the hydro-extractor will have a tendency to produce the same effect, or it may be the result of poor storage of the yarn after dyeing, where exposure of the "head" of the bundle to excessive light has to some extent changed the shade.

All of the above and other causes are likely to create this trouble where skein yarn is used. For this reason the trade generally have abandoned the skein yarn for goods

of this character and are using warp yarns where the process of dyeing is less liable to admit of any sharp variation in shade. Any changes which do take place are of a more gradual character and do not appear in such sharply defined bars.

Yellow Streak in Knit Fabric

We are mailing you a piece of fabric which you will notice has a yellow streak through the center. This streak is just as liable to come on the side as in the center, and on any kind of fabric this particular mill manufactures. These goods are knit in a mill that is located about 100 miles from our bleachery and are packed in cases apparently well papered and sent us in carload shipments. It is almost impossible to see any soiled marks on the fabric in the gray but they seem to have considerable trouble with the streaks and at times they run considerably heavier than the sample we are forwarding. The mill as well as ourselves have been trying to locate this trouble. We process from 5 to 6 tons of fabric a day and this is the only mill we get complaints from. Any information you can give us will be greatly appreciated. (4807)

It is difficult to place one's finger on the cause of this trouble without spending some time at the mill and bleachery. However, a few suggestions may help. It is apparent from the nature of the streak and also from testing it that it is a rust stain as it finally appears on the finished cloth. The mill should examine its knitting machines very closely, especially the take-up rolls, looking also for rusty needles and for oil which may be dropping on the cloth and carrying rust along with it. Any one of these would cause a straight line streak such as shown on this fabric, which of course would be hard to find in the cloth.

The bleachery should examine all machines through or over which this cloth passes, such as conditioning and spreading machines, folding machines and dryers of all types. Such a rust streak has been caused at the feed end of a dryer. As the cloth passed over the spreader the little rolls on the spreader became wet from the damp cloth and gave a rust line streak on the inside of the cloth which was discovered only after a thorough search. This streak is made in cloth as it is in the spread-out condition, not when it is in the rope form, so that we can eliminate all machines which take the cloth in rope form.

Streaks in Dyed Hosiery

Will you please look at the enclosed sock and let us have your opinion regarding the streaks. What is the cause? Why is there none in the heel and toe? The top is made of 40s-2, the leg of 50s-2 and the heel and toe of 60s-2, all C.P. mercerized yarn, with 60s-1 splicing, also mercerized. (4928)

The random knit effect in the sample submitted is caused by a difference in the quality of the strands in the 2-ply yarn. It may possibly be due to a difference in the fibre used, but more probably is caused by a lack of uniformity in the mercerization of the strands. You will note that the cuff takes a much darker color than the leg and foot. The splicing is also darker. We can see the random color in the heel but it is nearly covered by the deeper shade of the splicing. It is the practice in some mills in a case like this to strip and redye black. Sometimes the variation in mercerization will cause a black stocking to have a random color.

Machines for Infants' Shirts and Bands

What size machines would I need to make infants' shirts and bands from size 6 months up to 6 years? (4973)

This inquiry is very indefinite in that it gives nothing on the yarns to be used or the weight of the garments desired. If the garment desired is a ribbed garment the inquirer can figure that the diameter of the machine would be about 2½ inches wider than the sample garment. If it is a plain fabric made on cylinder needles only, the width of the fabric would be about the same width as the machine. The number of needles, of course, would be determined by the weight of the garment, count of yarn to be used, etc.

The following sizes of rib machines are used by some mills for making infants' shirts and bands:

Size 2	7 inch	270 needles
Size 3	8 inch	282 needles
Size 4	8 inch	300 needles
Size 5	9 inch	324 needles
Size 6	9 inch	340 needles

We referred the inquiry to a knitting mill superintendent and he replies as follows: Work of this kind would, no doubt, be made on ten cut or 30 gauge latch needle knitting machines. I believe that the following will show the width of these gar-

ments finished and also the knitting machines which would be required to make them.

Age	Width	Size Machine
6 months	7½	10 inch
1 year	8	11 inch
1½ years	8	11 inch
2 years	8½	12 inch
2½ years	8½	12 inch
3 years	8½	12 inch
4 years	9	13 inch
5 years	9	13 inch
6 years	10	14 inch

It will, no doubt, be necessary for the party who is to produce goods of this kind to make experiments with yarn to get goods of the right weight and size, but it is the writer's opinion that the knitting machines above in 30 gauge would produce the correct sizes for the line of goods inquired about.

Cream Bleach on Knit Webbing

We enclose sample of knit webbing which is called a cream bleach. We would like to know how they get this effect. Is it first bleached and then slightly colored in some way, or how? We will appreciate your advice and will thank you to return the sample enclosed, with your reply. (4966)

This cream bleach effect can be obtained by giving the underwear a half-bleach, which consists of a kier boil and a good rinse, then coloring it very lightly with a yellow dye. Only a few grains of color per 100 lbs. of cloth are required. With some underwear the coloring is not required after the half-bleach as the cloth has the necessary cream color. This depends directly upon the color of the original cotton which went in to make up the yarn from which the cloth was knit. If you do not have a kier, a good boil-out of three or four hours in a cloth machine will give the result, but a kier boil is better as it gives a cleaner bottom to the cloth. Any reliable dyestuff concern can sell you a color suitable for this staining effect. We are sending a sample of cloth obtained by a half-bleach and then coloring, but this sample has a heavier tint than you desire on your cloth. It is believed that the Auto-Gyp process of bleaching and dyeing in one operation, which is sold by the Surpass Chemical Co., Inc., Albany, N. Y., could be adopted to get the effect desired.

Extractors Used in Carbonizing Process

Where extractors are used in the carbonizing process they are generally supplied with lead-lined cases. Where sulphuric acid is the carbonizing medium this proves satisfactory. If a mill were to shift from the sulphuric acid process to the chloride of alumina process frequently would this have a more deleterious effect upon sheet lead than if it were to use only one of these processes? Any information you can give us will be greatly appreciated. (4784)

We see no reason why lead-lined hydro-extractors cannot be used for handling stock which is to be carbonized by the aluminum chloride method. A mill handling both the sulphuric acid process and aluminum chloride process should not experience any difficulty from corrosion on lead-lined hydro-extractors if they change from one process to the other at various times.

Stripping Blue Serge

Will you kindly tell me if possible the reason for the turning green of stripped old blue serge? Is there any way to stop the rags from turning green? They strip very good and look fine in the tubs but as soon as the air strikes them they turn a dark green. Would like very much to hear from you on this subject. We are stripping with Formopon X, using about 7%. (4962)

Certain dyes when subjected to the action of sodium hydrosulphites, of which formopon is one, are chemically reduced; that is, oxygen is taken away from the dye which thus becomes colorless, or nearly so. When such dyes in the reduced state are again exposed to the action of the air, the oxygen of the latter is taken up by the reduced dye, which again assumes its original color. This demonstrates that not all dyes may be stripped by such agents and recourse must be had to other chemicals.

As a general rule, however, when a dye on wool refuses to strip successfully with any of the hydrosulphites, it is likely that it will not strip with any other of the commercial stripping agents. Dyes of the class to which the dyes on the old blue serge belong are closely related to indigo, which is the most important dye that again takes up oxygen from the air and appears blue. The fact that the blue serge shows a green shade may be due to the original color of the cloth having been pro-

duced with a combination of dyes, one or more of which are more readily oxidized than the others.

It is suggested that stripping trials be made with a bath containing, for 100 lbs. of cloth or rags to be stripped, 4½ lbs. bichromate of soda, 9 lbs. oil of vitriol, and 4½ lbs. oxalic acid. Enter the goods and boil for one-half to three-quarters of an hour. It should be noted that complete stripping is not possible when the goods have been dyed with true alizarine dyes.

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